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WORLD OIL

SPECIALIZED FOR EXPLORATION, DRILLING, PRODUCING OPERATIONS AND MANAGEMENT

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In This Issue

- A new look at the Williston Basin, where the oil economy is maturing . . . Current Outlook Section
- An on-the-spot report on Cuba's lease play and drilling . . . International Section

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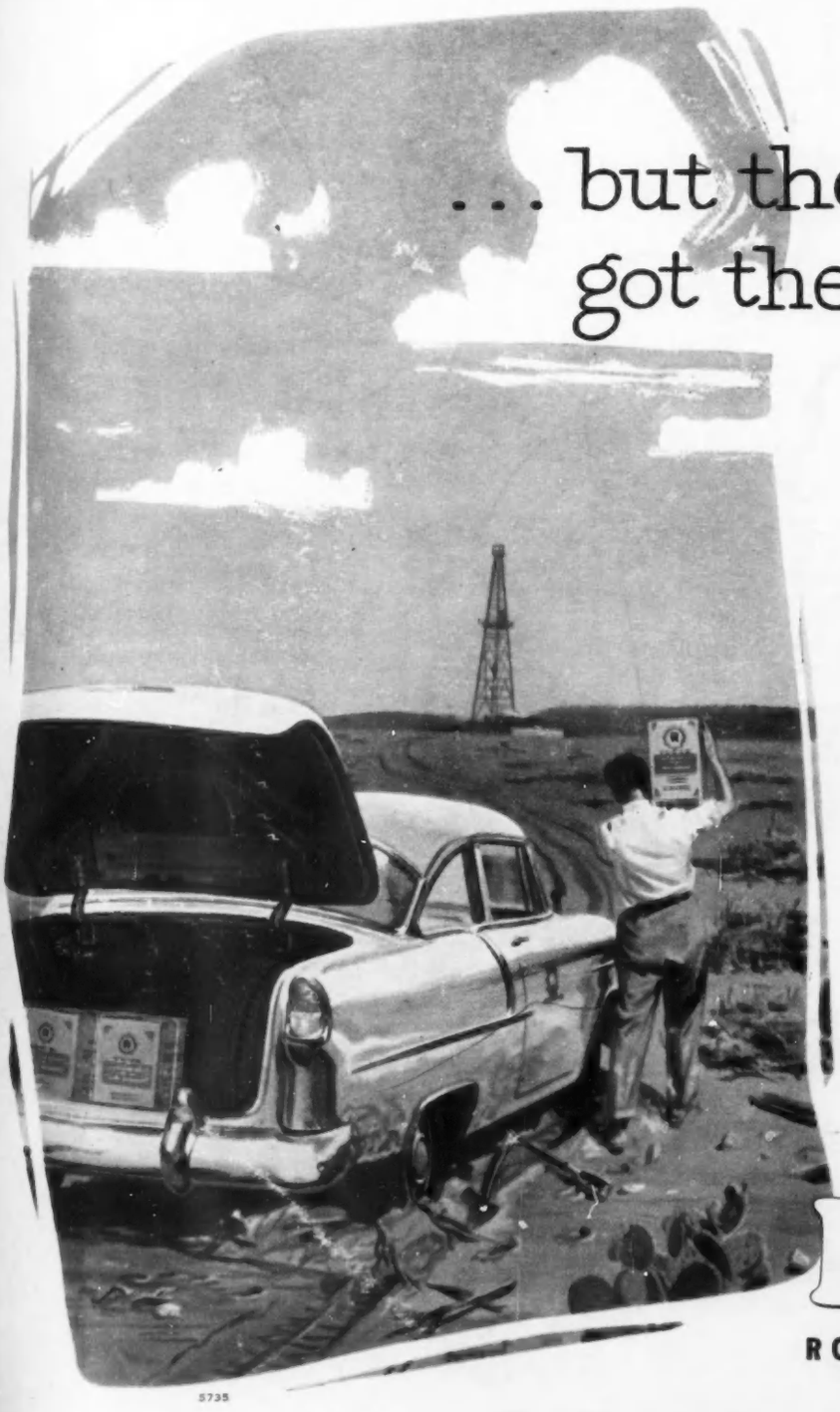

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a quick look at WORLD OIL THIS MONTH

BUSY OIL MEN: To help you put first things first, scan these time-saving digests on this and the following pages, checking ☑ those you want to read first.

CURRENT OUTLOOK ARTICLES

☐ **Steady development** is proceeding in the Williston Basin as new refineries provide market for crude production, while some pipe line construction is projected. Drilling is being carried on in substantial volume and additional fields have been discovered. Development has been particularly successful in that portion of the basin in eastern Montana. North Dakota activity will be increased through participation of additional operators. South Dakota has commercial production. For an up-to-date look at development in the Williston Basin, read **Williston Basin Oil Economy Is Maturing** ..... Page 66

Turn the Page ➧

THIS MONTH . . .

☐ **The successful executive** spends most of his time communicating. He should have facility in business correspondence, public speaking, and technical writing. Here is some solid information for anybody who can't answer these questions: Are you a goozler? Are your ducks lined up? Is your English telegraphic? See Page 72 for the anwers. **Managers Must Communicate**.....**Robert W. Hays**

☐ **Business records must be kept.** But unless they are handled in an orderly manner, they can create serious problems, resulting in loss of time, effort and space. The article starting on **Page 76** shows how one major oil company solved its records problems. **Putting New Life Into a Dead Records Program**....**Eugene C. Alford**

☐ **What is an accident prevention program?** After 21 years of trying to prevent accidents, Stanolind Oil and Gas Company has an answer—and a program—which stands it in good stead. See **Page 83. Emphasis Is the Answer in Stanolind's Safety Program. D. A. Klemme**

☐ **FTC's long-awaited merger report** refuses either to condemn or condone the wave of corporate marriages. But Congressmen revive an old Trumanism that holds it bad to be big.....**Tougher Stand on Mergers Threatened**.....**Page 86**

☐ **Congressional and executive accord** on the extension of the Trade Agreements Act virtually guarantees that the President will be legally empowered to restrict oil imports to a level which he feels is compatible with national security. Domestic oil and coal industries are watching the progress of this legislation closely. Import controls seem nearer, particularly in view of the Cabinet Committee on Energy Supplies and Resources recommendation of a specific limit above which oil imports may jeopardize national defense. See **Page 88, The Changing Panorama**....**Trade Act Allows President to Limit Imports**..**Harrison T. Brundage**

EXPLORATION ARTICLES

☐ **The continuous velocity logger** is a new and important tool in oil exploration work. This article describes the technique which greatly improves formation correlation and in some instances permits analytical evaluation of the formations penetrated in a drilling well. **New Logging Technique Speeds Seismic Surveys**.....**Page 101**

☐ **Growing vegetation** may be used to identify geological formations and as an aid in mapping areas where formations have been covered or where outcrops are poor and distinguishing characteristics are lacking. This tie between biology and geology is based on the fact that plants take from the rocks the different elements they contain. Certain plants grow best on certain formations. This correlation of plants and formations represents a valuable tool in the hands of the field geologist. For more on this interesting subject and a bibliography to which readers may refer if they wish to pursue the subject further, turn to **Page 102. Growing Vegetation Indicates Formation**..**Dr. A. N. Murray**

☐ **A major oil and gas field** may be in the making in western Kansas. Discovery of oil in the Mississippian lime in Kiowa County and a second discovery of gas in the same horizon 12 miles away indicates a major stratigraphic trap type reservoir south of Greensburg. Particulars of the discovery are in an article starting on **Page 106. Major Field Promised in Western Kansas**.....**Anthony Gibbon**

☐ **A new interpretation** of the complex geology of the Ardmore Basin is given in the timely article on **Page 108.** The information obtained through the study described here can be applied to most of the basin, thus opening new areas for oil development. **A New Look at the Central Ardmore Basin**.....**Richard F. Shaw, Jr.**

DRILLING ARTICLES

☐ **Radio for drilling operations.** Because field radio application is becoming so widespread, toolpushers and petroleum engineers may frequently be called upon to consult with the radio engineer in the design of a radio system for an oil company's particular operations. Here is a general description of the various types of petroleum radio systems, capabilities, limitations, cost, and operating features. Turn to **Page 119. Selecting a Radio System for Drilling Operations**.....**Jerry S. Stover**

☐ **Rebates and rate reductions** from the insurance carrier were the rewards when one drilling company reduced its accident frequency by 40 percent. The safety director points out that additional rewards included improved drilling operations. It's easy if you make the effort, he says. See **Page 122. We Reduced Accident Frequency 40 Percent**.....**Ben West**

WORLD OIL, published every month except semi-monthly in February and August. Entered as THE OIL WEEKLY as second class mail matter December 23, 1916, at postoffice at Houston, Texas, under the act of March 3, 1879.

THIS MONTH . . .

☐ **Deep drilling has come to the Appalachian area,** cradle of the U. S. oil industry. The development has brought about an increase in the use of rotary drilling, although cable tools still predominate. Even air and gas drilling has been used in the area. The general practices employed in the Appalachian area for both rotary and cable tools are discussed in the article on **Page 128. Deep Drilling in the Appalachian Area**. . **Byron M. Finch**

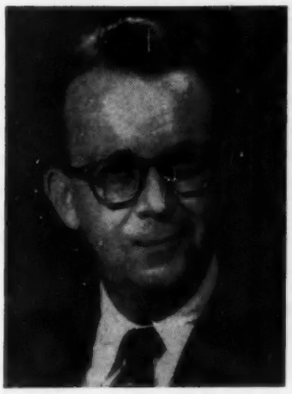
☐ **Time means money** to the drilling contractor. It is the variable which determines both his cost and his profit. Further reductions in time required to drill a well can best be achieved by closer teamwork between the contractor and the operator. A contractor suggests several ideas that will lead to closer cooperation. **Page 137. Closer Teamwork Between Contractor and Operator**. . . . . **J. U. Teague**

☐ **Bottom-hole information is expensive and important.** No other formation specimen can provide as much information as a core. Because of the high recovery factor, almost 100 percent, diamond coring is on the increase. Some of the important problems involved in this coring technique are described in an article starting on **Page 143. How to Get More Profit Out of Diamond Coring**. . . . . **B. G. Harmon**

PRODUCTION ARTICLES

☐ **The design of gas lift installations** becomes complex in dually-completed wells when both zones are being produced artificially. The producing problems of each well must be considered carefully to properly select the type of equipment which will do the best job. The many factors involved are discussed in an article on **Page 157. Good Installation Design Vital in Gas Lifting Dual Zone Wells**. . . . . **H. W. Winkler**

☐ **Specially-designed paraffin barges** are one of the workhorses for Gulf Refining Company in the bay and marsh fields of southern Louisiana. In addition to handling a number of wire line operations, they perform such jobs as scraping paraffin out of tubing, steaming paraffin from flow lines, and cleaning christmas trees before painting. Pay a visit to one of these barges by reading. . . **Paraffin Barges Do Many Jobs in Coastal Fields**. . . . . **Page 178**



W. B. COLVIN

H. T. BRUNDAGE

Colvin Rejoins WORLD OIL Staff, Brundage Named Eastern Editor

W. B. (BILL) COLVIN returned to the position of Drilling Editor of WORLD OIL on June 1. Colvin held this post in 1951 and 1952, before going to Venezuela with Socony-Vacuum Oil Company.

Colvin began his oil industry career as a roustabout prior to studying petroleum engineering at the University of Tulsa from 1939 through 1941. He returned to field work with Stanolind Oil & Gas Company in 1941, and later was promoted to petroleum engineer.

He became a field service engineer for Baroid Sales Division of National Lead Company in 1943. He was with Magnolia Petroleum Company from 1945 until 1951, advancing to senior petroleum engineer in the Gulf Coast Division.

HARRISON T. (SPUD) BRUNDAGE was named Eastern District Editor for WORLD OIL on June 1. His headquarters will be in New York City.

Brundage comes to WORLD OIL from the South Texas geological division of Sunray Oil Corporation. A 1948 graduate in geology from Yale University, he first did scouting and then geological work for Stanolind Oil & Gas Company in the San Antonio area. In 1951, Brundage joined the Petroleum Administration for Defense in Washington, D. C. Before joining Sunray, he was employed by H. B. Putnam, independent oil operator of Ohio.

☐ **What's new in production methods and equipment** is a yardstick which is indicative of the continuous advancements being made year after year to increase oil recovery and cut production costs. Here is a brief review of some significant developments which occured in the past year. Some are refinements

Turn the Page ➧

THIS MONTH . . .

of well-established practices; others are new ideas recently taken from the realm of research and put into field operation. For illustrations and brief descriptions, see **Page 166. What's New in Production Trends and Equipment**.....**H. A. Rankin**

☐ **Very substantial reductions** in production maintenance expenses have been achieved by Cities Service Oil Company through the development and application of a corrosion mitigation program. What this company did and the result attained are told in the article beginning on **Page 182.** If you are having trouble with corrosion it will pay you to read this article. **How to Reduce Corrosion in Production Operations**.....**W. C. Koger**

INTERNATIONAL ARTICLES

☐ **British Petroleum Company,** after nearly 20 years of seeking and producing oil in Great Britain, has about 230 producing wells. New wells are being drilled in a recently-found fourth field. For a report on operations in Great Britain, read...**British Petroleum Nears 20th Year**.....**Page 215**

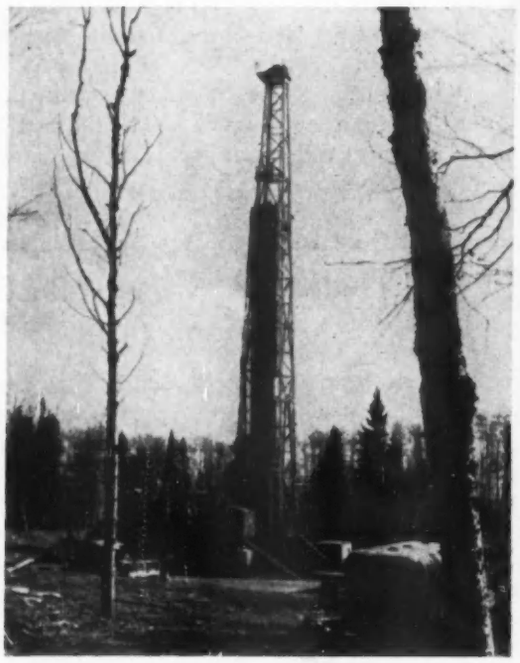
☐ **Guatemala's new petroleum code** is expected to increase exploration. For details of the new laws and restrictions by which the government hopes to create a political climate which will draw the interest of oil companies, see **Guatemala May Grant Oil Exploration Permits Soon**.....**Page 216**

☐ **The increasing number** of U. S. oil men and oil companies interested in Cuba's fast developing oil industry can be traced to the government, climate, and currency convertibility among other factors. To size up Cuba's lease play and drilling, WORLD OIL sent its Mid-Continent editor to the island. His report starts on **Page 218. Cuba Is "Hot"**.....**Anthony Gibbon**

☐ **The Belgian Congo,** rumored to be the site of untold wealth, is relatively unknown although it is explored. Beginning on **Page 224** is a brief geological summary of the extensive Congo river basin and information on what possibilities it holds for the oil explorer. **Belgian Congo Geology Offers Possibilities**..**H. W. Straley III**

☐ **Reports indicate** that the USSR is "willing" to sell to Rumania, Hungary, and Bulgaria its shares in the satellite oil agencies. Turn to **Page 229** for a summary of this development and possible motives for the action. **Why Do the Soviets Want to Pull Out of Satellite Firms?**.....**Don Kliewer**

NEXT MONTH . . .



The Canadian picture is part of the story of around-the-world oil operations to be presented in the August 15 International Outlook Issue of WORLD OIL. Above is a well near Sturgeon Lake.

Your WORLD OIL Extra

ARE YOU INTERESTED in how the full-speed-ahead oil activities around the world will affect you, your company and its operations? If you are, the International Outlook Issue to be published August 15 will give you the complete picture, from Alaska to New Zealand, with a long look behind the Iron Curtain as an added bonus. The feature-packed edition will be combined with the annual Mid-Year Outlook Issue, filled with the latest data on inside-U.S. operations.

The oil story, country-by-country, maps of important producing areas, the authoritative mid-year drilling survey and forecast, the U. S. import situation—these are some of the important, factual articles WORLD OIL will give you in . . .

The International Outlook Issue
To Be Published August 15

Looking Ahead . . .

. . . **More diesel-electric rigs** will be seen drilling industry. Manufacturers long swamped with railroad orders are now turning to oil industry with engine that corrects past faults of being over-weighted and under-powered. New rigs are particularly applicable to platform-and-tender drilling offshore. Reasons: Ease of rigging up, need for less heavy iron on platform, lighter foundations, absence of heavy flow lines from tender to platform.

. . . **Drill tubing is revolutionary experiment** being conducted on West Coast and in Venezuela. Lightness of pipe could conceivably alter future rig design.

. . . **Presidential signature on Reciprocal Trade Bill** has given many independents brighter outlook on imports problem. As WORLD OIL predicted last month, presidential authority to curb imports is invitation to independents to watch brought-in oil more closely than ever—and to raise clamor when volumes exceed 1954 ratios to domestic production. (For more about the import situation and outlook, see Page 88.)

. . . **Known U. S. fields will eventually produce 88 billion barrels of crude,** Interstate Oil Compact Committee predicts. Present reserve is put at 40 billion barrels, or 39 percent more than API estimate of 28.9 billion. Difference lies in IOCC's estimate that 29.1 billion can be recovered by fluid injection methods alone.

. . . **Pipeliners will hunt uranium.** Men laying Pacific Northwest Pipeline Corporation line from San Juan Basin to West Coast will be equipped with Geiger counters as spreads work through Utah, western Colorado.

. . . **Minimum wage will probably rise** from 75 cents to $1 this summer, but no higher. Ike had proposed 90 cents, labor $1.25.

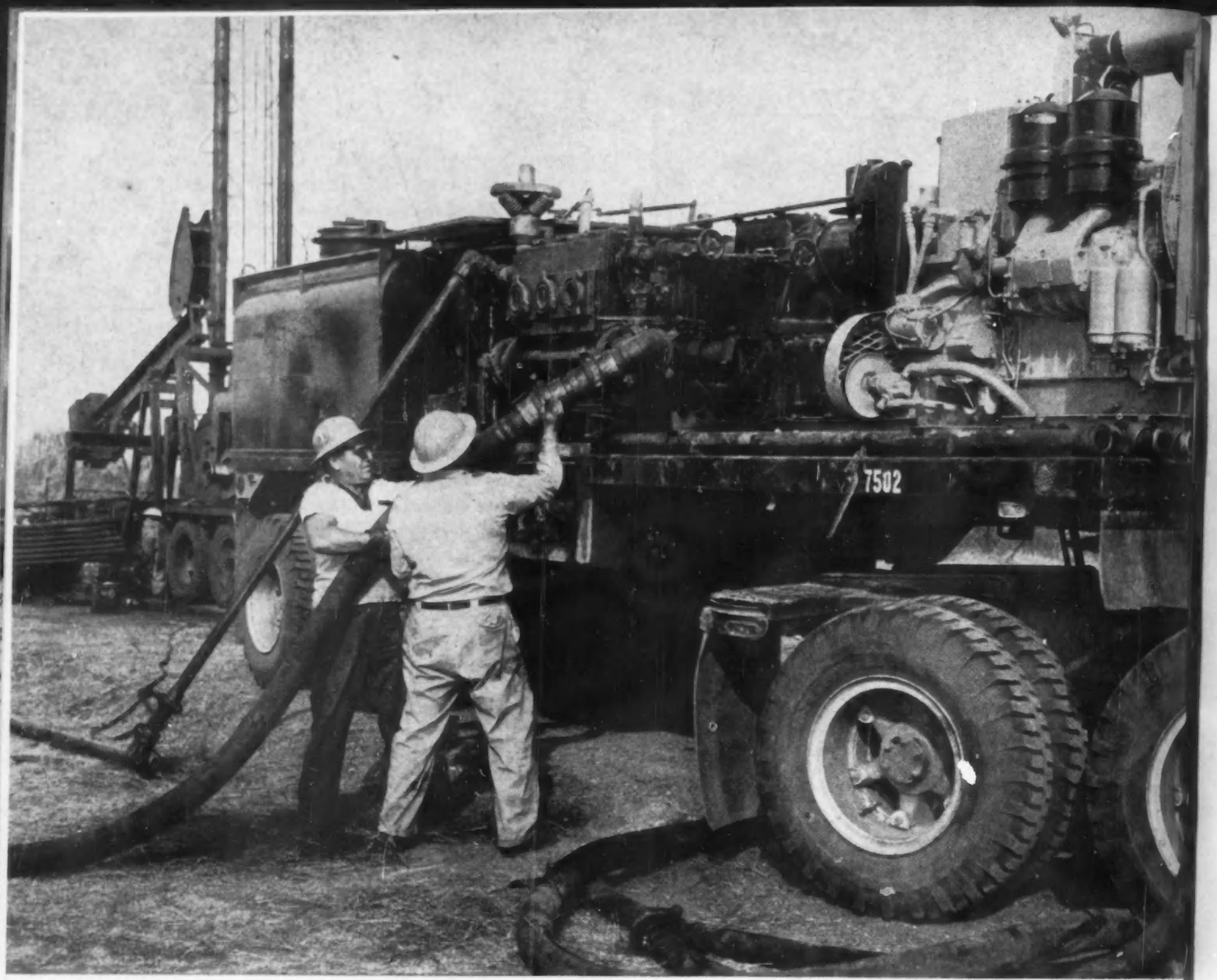
. . . **20 million acres in Alaska may be opened** to private development. Interior Department is asking chairmen of four congressional committees views on throwing open lands outside Naval Petroleum Reserve No. 4. Acreage on known geologic structures would be subject to competitive bidding. Remainder would be leased to first qualified applicant. Navy has no objection to plan.

. . . **Great advances are ahead in equipment design.** Reason: Larger companies are now solidly manned with equipment engineers who have added talents to those of manufacturers' design engineers, until five years ago responsible for virtually all design progress. Improved teamwork has already paid off in faster penetration rates.

. . . **Part of Trans-Canada gas line likely will be operating by next year.** This was indicated by closing of first contract in Western Canada for shipment of Alberta gas to Winnipeg. Winnipeg Central Gas Company will buy 200 billion cubic feet during 20 years.

. . . **Federal fuels tax hike** this year may hinge on politics. Dem leaders want credit for highway program, but fear bill calling for major expenditures without provision for financing would invite Republican charges of irresponsibility. One-cent gasoline hike and higher levy on diesel fuel may thus be written into road bill itself, but passage by House is far from certain.

. . . **Austria may become net importer through Russian deal.** Under terms of Soviet pullout, Austria must provide latter with 8,824,400 barrels annually. Domestic needs are 9.5 million. Combined demand will certainly strain producing capacity beyond certainty of consistently meeting it; and if, as some believe, Austrian potential is overestimated, nation would have to fill part of its needs through imports.



SANDFRAC

DOWELL-developed fracturing treatment jumped flow from 36 to 360 BOPD

A new well drilled into a sand formation produced 36 barrels of oil per day, natural. To make the well a more profitable producer, the operator called Dowell.

Dowell engineers used Sandfrac®, a Dowell-developed fracturing service, to put 5,000 gallons of oil and 10,000 pounds of sand into the pay zone. As a result of this down-casing treatment, production rose sharply to 360 BOPD . . . *ten times* the original rate per day.

Most lease crude oils can be used in Sandfrac treatments. These materials can be modified on location with additive agents to control thickness and fluid loss. Where suitable lease crude is not available, Dowell provides special oils ideally suited to Sandfrac treatments.

Sandfrac equipment—for mixing, sand proportioning and high-volume pumping—is designed by Dowell men with years of oil-field experience. You can *depend* on Dowell equipment, Dowell men and Dowell methods for well treatments engineered to get the best possible results.

For more information or service, call any of the 165 Dowell offices in the United States and Canada; in Venezuela, contact United Oilwell Service. Or write to Dowell Incorporated, Tulsa 1, Oklahoma, Dept. G-13.

services for the oil industry

DOWELL

A SERVICE SUBSIDIARY OF THE DOW CHEMICAL COMPANY

July

Suppose You Didn't Have Them!

We were listening to a report on what happened to oil field supply store profits in 1954 and prior years, during the June meeting of the Petroleum Equipment Suppliers Association, when suddenly the thought came to me:

"Suppose we didn't have any supply stores?"

It seems that year by year the expense of operating supply stores all over the U.S. has been increasing and the margin of profit becoming less and less, until in 1954 the average profit of 21 supply companies after taxes was only 2 percent. Each year for the past several years the profit has been dwindling, and of course for supply companies to earn an average of only 2 percent means that many supply stores are operating at a decided loss.

No wonder the supply boys were worried.

But suppose we didn't have any supply stores!

•

We have no record of when the first supply store was opened but we do know that one large supply company has been operating under the same name for 93 years. We have become so accustomed to seeing the supply stores move in with the drilling and production men that we simply take them for granted. And we suspect that in our busy daily life most of us have failed to give them the credit they are due in our oil production picture.

The average supply store in an active area will stock many thousands of items. The average investment in stock in a supply store will run $198,000. These are not imaginary figures. They come from the supply companies' reports themselves.

What a headache if the operators in, say, the Harvey, Louisiana, area, had to do without supply stores!

Here is some of what *would* happen if we didn't have supply stores:

• Everyone, big company and little operator alike, would have to provide his own warehouse of some kind. Some would be tiny, some would be large, and the total investment in land, buildings, stock (remember that $198,000) would be tremendous, and an increased warehouseman payroll would be a big item.

• But, you say, in that event the manufacturer would have to stock the items. All right, suppose he does. If he did, wouldn't your costs go up as a result of the manufacturer carrying such stocks?

• It would mean establishing credit arrangements for thousands of operators with hundreds —almost 1000—manufacturers.

• In many instances it would mean that delivery equipment would have to be provided for the smaller operator who possibly does not now have it in operation. Certainly delivery is one of the expenses we heard mentioned which the supply man would like to eliminate.

•

Of course there is no likelihood that the oil industry in the U.S.A. will suddenly or in any other manner, be deprived of the service of supply companies and their ready emblem of service—the supply store, but the report of the committee on "How Are We Doing" should remind us how fortunate we are to have them.

No, we are not going to lose our supply stores but they will have to make more profit to keep up their past and present good service.

Ray L. Dudley

A SERVICE SUBSIDIARY OF THE DOW CHEMICAL COMPANY

WILLISTON BASIN OIL

How the Williston grew . . .

REFINERIES

Now operating in U. S. part of basin—a 33,000-barrel-a-day plant at Mandan, N. D.; a 2000-barrel plant at Williston, N. D. and a 2000-barrel plant at Dickinson. Contract has been let for 5000-barrel plant at Rapid City, S. D. Natural gasoline plant processes 65 million cubic feet of gas daily at Tioga pool, N. D.

PIPE LINES

Products from Tioga natural gasoline plant go through pipe line to Mandan refinery. Shell and Murphy will build 450-mile 16-inch crude line from Basin's eastern Montana fields southward to trunk lines in Wyoming. Standard plans similar Montana-Wyoming line—350 miles of 16-inch.

DISCOVERIES

In the Basin's Montana sector, four new pools had been opened by the end of 1954. Two additional new pools appear assured so far this year. Three pools of minor importance were discovered in North Dakota in '54. No new pools have been discovered in the first half of '55. The discovery well of South Dakota's only oil field was completed in '54.

DRY WILDCATS

Along with discoveries have come disappointments. In eastern Montana part of the Basin, there were 25 wildcat failures in '54 and more in '55. In western North Dakota there were 28 dry wildcats in '54, 8 in first half of '55. South Dakota had about 25 dry wildcats drilled in '54, 3 so far in '55.

RIGS RUNNING

North Dakota has 21 rigs in operation, including 11 development wells, 10 wildcats. South Dakota has 2 wildcats currently drilling. Eastern Montana has some field and wildcat drilling. Activity will be stimulated by pipe line construction.

THE OUTLOOK

Markets for Williston Basin crude are being gradually expanded through construction of refineries and pipe lines. Active field development and wildcatting will be required to keep crude supplies in line with market outlets.

- The area is becoming an integrated oil region.
- New refineries and pipe lines providing outlets for increasing production.
- Drilling active in eastern Montana. North Dakota stepup due.

THE CHIEF DEVELOPMENT of the Williston Basin of North and South Dakota and eastern Montana during the past year, was its swift emersion after the discovery of oil from the status of an oil producing area into the full role of integration in the petroleum industry.

The emergence was accomplished with the construction of three refineries in the newly eminent oil production area of northern U. S. and the construction of the first natural gas processing and repressuring plant, and will be further enhanced by proposed pipe lines.

Few, if any, oil producing areas in the U. S. in its decades of oil history, have experienced the swift growth from a pioneer oil producing province into a mature oil economy with production, pipelines, refineries and market outlets that has characterized the growth of the Williston Basin in its slightly more than three-year span of oil history.

ECONOMY MATURING

This fast maturing of the state's oil economy has served to eclipse the importance of the more moderate pace of exploration activity in the Basin. This moderate pace of exploration resulted partly from a lack of assurance that a market would be provided for the oil production already developed.

Experience dictated that oil operators in the nation's new oil-producing province should stop, regroup available data on the potentialities of oil production in the Basin, and consider the place the Basin could expect to take in the nation's oil production picture.

This assurance is available to the Williston Basin in 1955.

Refinery built. The Basin completed its short cycle from a wildcat oil producing territory to a complete component in the nation's petroleum industry with the completion of a modern refinery at Mandan, N. D., by Standard Oil Company (Ind.) It has a capacity of 33,000 barrels daily.

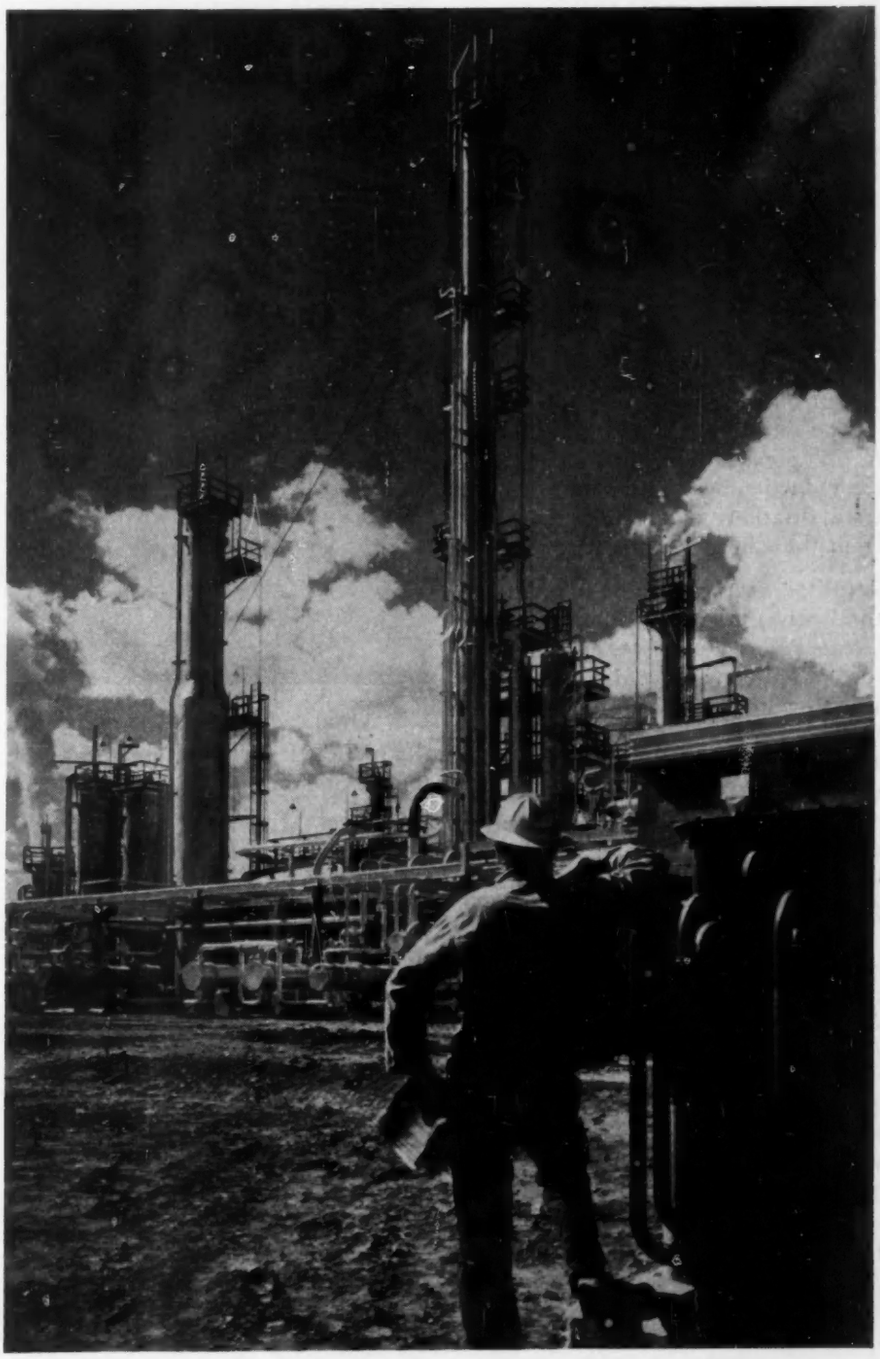
Standard of Indiana's entrance into the refining field of North Dakota provides the company with an untouched source of crude oil to combine with a better service of its northern U. S. marketing territory.

By spring of 1956, Standard will have completed a 6000-barrel-a-day ultraforming unit at the Mandan plant.

It will enable Standard to better process Williston Basin crude oil.

Late in 1954, the Williston Basin Refining Corporation placed on stream at Williston, N. D., a 2000-barrel-a-day plant with cracking capacity of 300 barrels daily.

At Dickinson, the Queen City Refining Company completed a 2000-barrel daily plant. This company recently completed a contract to take

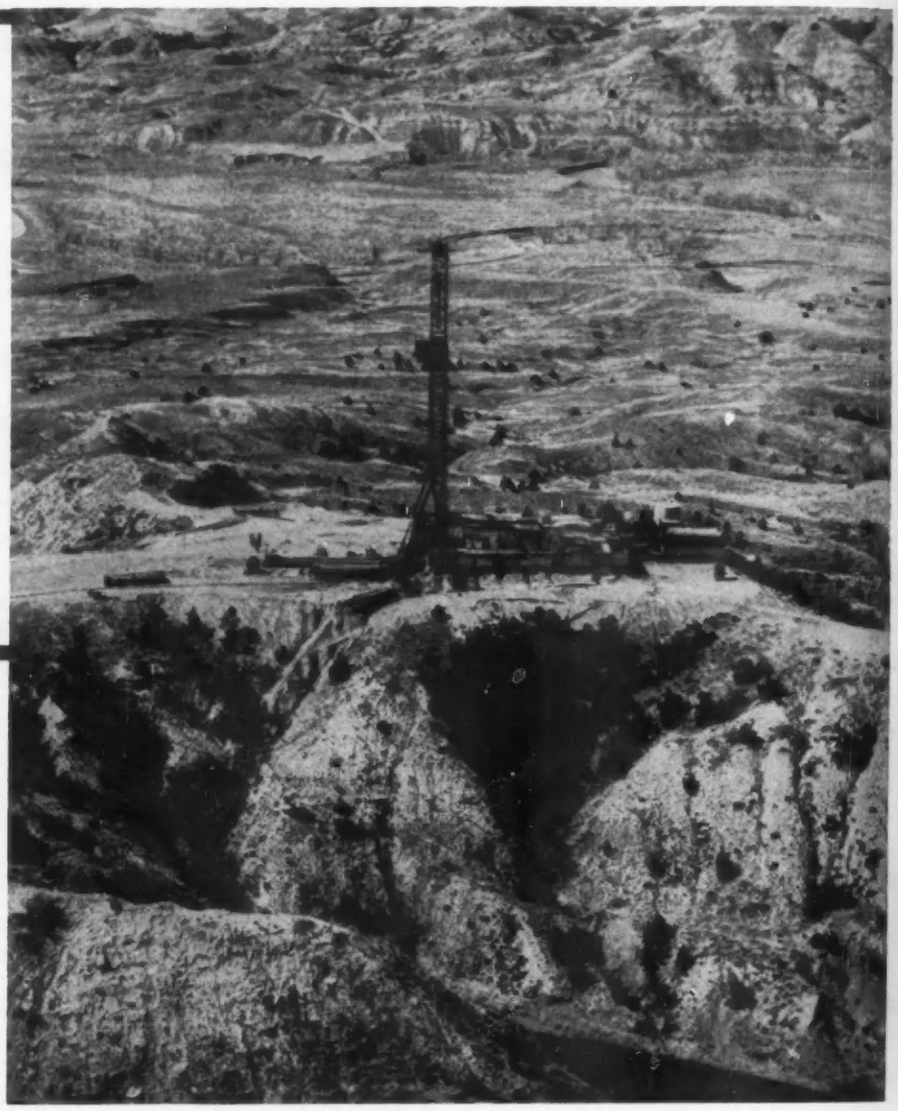


Standard Oil Company (Ind.) Photo

Some of the complex facilities of the new Standard Oil Company (Ind.) refinery at Mandan, N. D., which went on stream in October, 1954. It processes crude from North Dakota portion of Williston Basin. It was the first complete refinery built from ground up in U. S. in past 40 years.

WILLISTON 'HOT' SPOT

- **Eastern Montana likely to lead Basin development this year.**
- **Two projected pipe lines to spur development. One approved. Second slated for approval.**
- **Two new pools this year considered a certainty.**
- **At right is Shell Oil Company's discovery well in the Gas City Pool, Dawson County, Montana.**



the crude oil from the Heath sand oil producers in the Belfield and Fryburg pools of North Dakota. The wells are owned by Amerada Petroleum Corp.

The accessibility of refined products for the great farms of this area means the reduction by hundreds of miles the transportation of refined products from the Chicago refining area.

Another refinery. Newest plant for the Basin is the projected plant by the Great Plains Refinery and Development Company, Rapid City, S. D. Contract has been let to the Carter-Grove Construction Company, Chicago. Capacity will be 5000 barrels daily.

Several refineries in Minnesota may offer additional outlet for North Dakota Williston Basin crude when the production becomes sufficiently great.

There is a possibility, however, American crude oil may have to compete for this market with crude oil from the Canadian portion of the Basin in Manitoba and Saskatchewan.

International Refineries, Inc., has a 12,000 barrel plant at Wrenshall.

Northwestern Refining Company has a 10,000 barrel plant at St. Paul Park.

Great Northern Oil Company is building a 25,000 barrels daily plant at Pine Bend, just south of St. Paul.

At the Tioga pool of North Dakota, the Amerada Petroleum Corporation and Signal Oil & Gas Company completed a natural gasoline processing plant with a daily capacity of 65,000,000 cubic feet of gas daily.

Products from the plant are piped to the Standard refinery at Mandan through a carrier constructed by the Service Pipe Line Company, a wholly-owned subsidiary of Standard.

Also at Mandan, ready to absorb the propane and butane products not usable in full by the Mandan refinery, is a bulk receiving station of the Tuloma Gas Products Company, a subsidiary of the Stanolind Oil & Gas Company, with its headquarters in Tulsa.

With the completion of the Standard refinery, producers in the Williston Basin received additional benefits.

Before completion of the plant, crude oil production in the North Dakota portion of the Basin averaged around 14,000 barrels daily

With the completion of the plant, Standard nominated for approximately 30,000 barrels daily from the North Dakota fields for its Mandan plant. Until further outlets are provided, production will be settled on this quota.

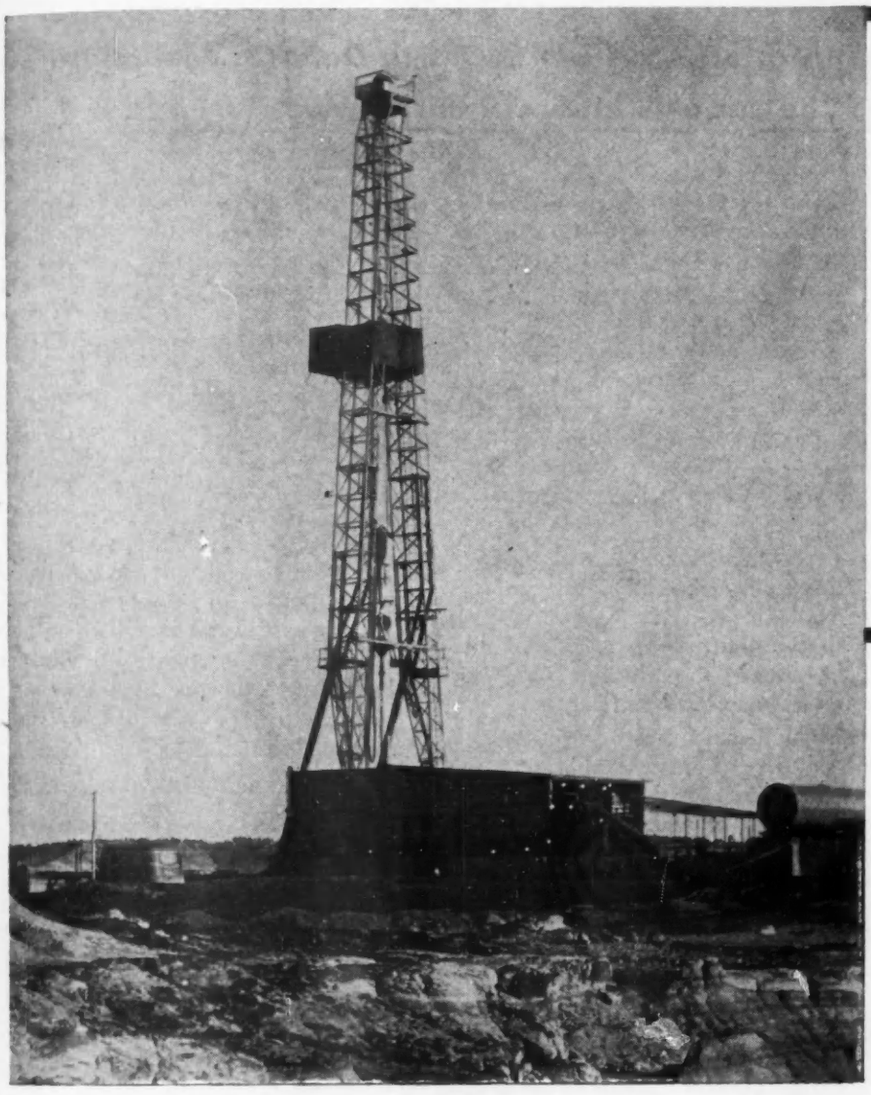
The North Dakota crude oil originally was $2 a barrel. Standard raised this price to $2.50 a barrel after completion of its refinery and to $2.90 a barrel, effective January 1, 1955.

Eastern Montana sector of the Basin appears likely to lead Basin development during this year.

Two projected pipe lines from the Montana sector will spur this development. One line has been approved and the second is expected to be approved.

Shell Pipe Line Corporation and Murphy Corporation will build a 450-mile 16-inch pipe line from the Poplar area, through Glendive and south through Wyoming to the Platte Pipe Line Company's western terminal. Later, the Northern Pacific Railroad Company took a 10 percent interest in the project.

The Standard Pipe Line Company has asked permission for a 350-mile,



WILLISTON WEATHER

- **Intense cold an ever-present problem during winter months in Basin.**
- **But rigs are winterized so that development may continue during sub-zero weather.**
- **Left is typical winterized rig, Shell Oil Company's State 1, first commercial oil well in South Dakota. Well was completed in 1954. Picture was taken shortly before drilling was completed.**

16-inch crude line from Glendive in eastern Montana to Guernsey, Wyo., also to connect with the Platte system there.

Readily accessible crude outlets will spur the Basin's Montana field development, where discovery successes have been in a ratio larger than in North Dakota. Despite these successes, however, development has lagged behind the North Dakota Basin areas, where daily production is almost twice that in the Montana areas.

Two new oil pools appear assured in Eastern Montana so far this year.

The California Company's Grimm 1, C NE SE 13-32 n-48w, 21 miles northwest of the Poplar pool, most northeasterly Montana Basin pool, drilled to 9761 feet. It was to be completed in the "C" zone of the Charles where it showed for 20 barrels of oil an hour on drill stem test from 6538 to 6553 feet.

New Ordovician age pool for Dawson county, southeast of the Yellowstone pool, was opened by the Shell Oil Company 33X-21, C NW SE 21-14n-55w, with pay from 9124 to 9162 feet in Red River sand.

Four new pools had been opened by the end of 1954 in the Montana basin areas.

Shell opened the East Little Beaver pool in Fallon county, with Unit 14-34, C SW SW 34-5n-61e, in Red River sand on the Cedar Creek structure two miles northeast of the Little Beaver pool. The well also showed for possible commercial production in the Madison of early Mississippian age. Discovery pay is 8202 to 8319 feet.

The West Poplar area of Roosevelt County was opened by The Carter Oil Company and Phillips Petroleum Company's Tribal 1, C SW SW 5-29n-50e, just east of the East Poplar pool. Pay is 6471 to 6478 feet.

In McCone County, R. V. and T. F. Hodge found the West Richey pool with the Eggerbrecht 1, C SW SE 3-23n-49e, completed for the first production in a formation of Silurian age at 9060 to 9225 feet. The Mission Canyon, of Mississippian age, also showed for possible commercial production.

In Wibaux County, Lion Oil Company opened the Wibaux pool with the Knight 1, C SW NW 29-14n-60e, east of the Cedar Creek anticline and in an area where there had been almost no drilling prior to this discovery. Production is from the Red River.

There were 25 wildcat failures drilled in the Montana portion of the Basin in 1954, many of which were taken to the Ordovician to insure testing of all formations to that depth.

North Dakota. The fact that oil companies are taking a new look at North Dakota, is not expected to affect adversely development in that portion of the Basin.

While discoveries in North Dakota have been fewer than in Montana, the fields have been of better quality and apparently offer a greater ratio of success in development than the Montana pools.

Actually, a reexamination of North Dakota might have been expected before this, but the fact that one company has dominated exploration in the state may have contributed to this situation.

Since the first of the year, however, three other major companies have entered the state as producers. They are The Carter Oil Company, Pure

Bottineau County holds exploration spotlight in North Dakota. Just south of the Canadian border, the area is still without a pipe line outlet

Oil Company and the Stanolind Oil and Gas Company.

Competition compels a recheck if it results in nothing more than a company relinquishing widespread held acreage with drilling contemplated far in the future. Rental funds can be diverted to exploration and development.

In central North Dakota, on the east flank of the Nesson anticline, acreage is being released in large blocks.

Such action by the oil companies does not mean that this acreage is or would be unproductive. Usually it means that it does not come within the scope of present development and wildcatting programs. Counties included are McKenzie and Hettinger.

This is illustrated by the Beaver Lodge field of Williams County, North Dakota, which now is 11 miles long and 3 miles wide, with more than 200 oil producing wells.

North Dakota's need for additional crude oil outlets is pressing, and retarded entrance of these outlets could adversely affect development this year.

At the end of 1954, North Dakota had 442 producing wells which had produced approximately 13,000,000 barrels of oil.

The state's oil production this year should nearly equal the cumulative production to the end of 1954.

The discovery picture for the North Dakota sector for 1955, however, is no rosier than it was in 1954.

No new pools have been discovered in the first six months. In 1954 only three pools of minor importance were found.

Stark County was opened to oil production by the Amerada Petroleum Corporation's Newton 1, C NW SW 31-140n-99w, the third discovery for Amerada in North Dakota in 1954.

The discovery is four miles northeast of the Fryburg pool of Billings County. Production was found in the Heath limestone of late Mississippian age at 8249 to 8254. Production was small, accompanied with some water, and there has been no development in the area. It was named the Belfield pool.

This is one well from which the Queen City Refining Company at Dickinson has contracted to take the oil. It is possible new development is contemplated by Amerada.

Amerada also opened the White Earth pool in Montrail County, in the Madison limestone of early Mississippian age with the Lokken 1, C NE SW 2-157n-94w, with pay from 8420 to 8430 feet. The discovery is three miles east of the Tioga pool.

In Williams County, William Herbert Hunt, independent oil operator of Dallas, opened the McGregor pool with the Gohrick 1, SE SE 5-158n-95w, also in the Madison limestone from 8148 to 8277 feet.

North Dakota saw the completion of 28 dry wildcats in 1954, in the western half of the state, approximately half of which had significant oil shows. These shows are expected to lead to additional development.

Expected to highlight exploration in North Dakota during the remainder of 1955 is Bottineau County. Production in this county lies just south of the Canadian border and as yet is without pipe line outlet. Production, however, has been going to Michigan refineries.

Some of the wells have come in for initial flows of more than 30 barrels of oil an hour.

Northwestern Refining Company, St. Paul Park, Minn., has entered the area, apparently with view of building up its own production for its Minnesota plant.

Latest available figures for North and South Dakota in 1955 show the following:

Wells or Rigs	North Dakota	South Dakota
Total wells drilled	**96**	**3**
Oil	70	..
Dry	26	3
Development Wells Drilled	**80**	..
Oil	70	..
Dry	10	..
Wildcats Drilled	**16**	**3**
Oil	..	..
Dry	16	3
Rigs Running	**21**	**2**
Development Wells	11	..
Wildcats	10	2

Amerada and Hunt Oil Company have reentered the South Dakota play, and each is drilling a wildcat well in Harding County.

South Dakota portion of the Basin, in the northwest corner of the state, entered the oil producing picture in 1954.

The Buffalo field of Harding County was opened by the Shell Oil Company's State 1-A, SW SE 9-2ln-4e, from the Red River, with pay from 8587 to 8600 feet and 8660 to 8681 feet. Shell succesfully completed a confirmation well in the area. The pool is 30 miles southeast of the Little Beaver pool in Fallon County, Montana.

A summary of North Dakota operations in 1954 shows:

Completed Operations

Wells or Rigs	1954	1953	% Diff.
Wildcats			
Oil	5	12	—59
Gas	....	1	....
Dry	114	79	+44
Total	119	92	+30
Success Ratio	1:24	1:7	....
Field Wells			
Oil	73	164	+ 6
Gas	....	....	....
Dry	13	13	....
Total	86	177	+106
Rigs Operating at End of Year			
Wildcats	6	14	—57
Field Wells	19	16	+19
Total	25	30	—17

There were approximately 25 wildcats drilled in 1954 in South Dakota. Harding, Corson, Perkins and Butte counties participated in the activity.

There apparently are enough untested possibilities still in South Dakota to justify additional exploration.

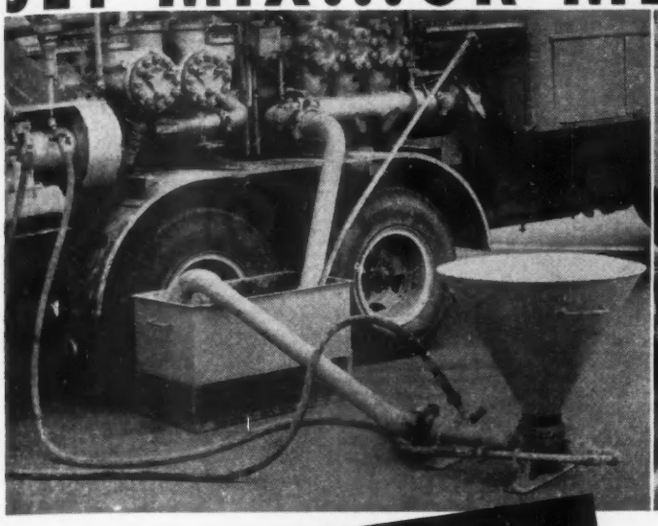
Some geologists say the state holds possibilities of considerable stratigraphic traps. As the known geological structures are tested, this may bring a greater amount of random drilling to the state.

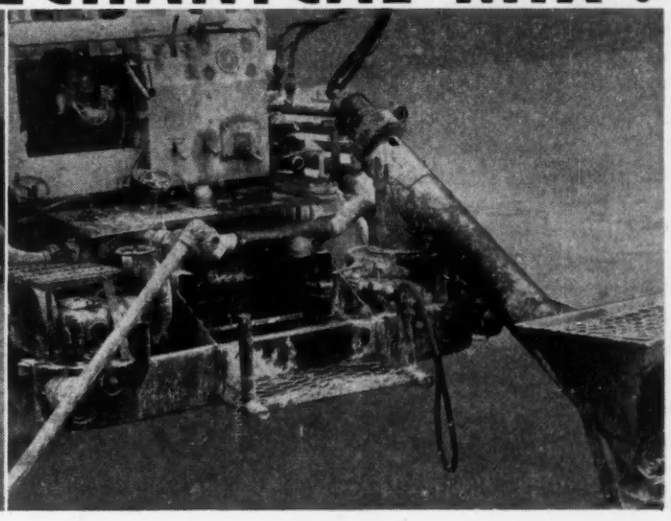
There has been no reef lime production yet discovered in the Williston Basin. At least none that so far has been characterized as reef production.

There are geologists who refuse to rule out the existence of such reefs in Williston.

—The End

JET MIX...OR MECHANICAL MIX?





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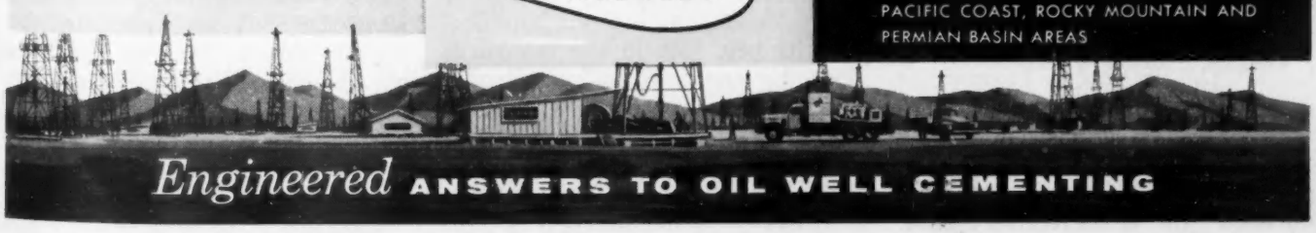

Engineered ANSWERS TO OIL WELL CEMENTING

Managers Must Communicate

Executives spend most of their time communicating. They must have facility in business correspondence, public speaking, and technical writing.

By ROBERT W. HAYS, Assistant Professor,
Southern Technical Institute, Chamblee, Ga.

SKILL IN COMMUNICATING is almost as important to an executive as are technical and managerial know-how.

The successful executive spends most of his time communicating. Therefore, he needs facility in business correspondence, public speaking, and technical writing.

Correspondence—Alert industrialists and businessmen have freed themselves from the trite, wasteful, bewhiskered old expressions dictated in business correspondence a generation ago. Instead of clinging to time-worn, retreaded expressions such as "I am in receipt of yours of the 29 inst . . .," the alert dictator remembers the first maxim of effective letter writing: a letter worth the approximately 50 cents it costs must win the reader's favorable attention. It must avoid the trip to the "circular file."

An application of practical psychology has made warmth and personality the most arresting characteristics of the modern business letter. The businessman should adopt the proper mental attitude as he begins to dictate. The alert dictator recognizes that first, his reader is an egotist who may have slight interest in the letter or in its author. Therefore, the most important pronoun in writing effective letters—letters that get results—must always be "YOU." In fact, a businessman may adopt this rule-of-thumb to test the effectiveness of his letters: "I," "we," or the name of the writer's company should not appear as often as the word "you" or the receiver's name. For if the letter contains a preponderance of "I's," it will probably not interest the reader.

"Take the other person's point of view" is an axiom surely practiced by successful salesmen; furthermore, this axiom involves much more than simply counting pronouns. For even a letter which passes the above-mentioned rule-of-thumb may not reflect genuine concern for the other person's point of view. This rule of thumb is no more than a minimum standard.

This proper mental attitude should be a question: "What does the reader of this letter need that I want to supply?" Or, before writing an adjustment letter or a claim letter, the businessman should ask himself: "What does the reader expect, and how will what I intend to say affect him?"

The effective letter then, must display warmth, friendliness, and consideration for the reader's personality. It should follow the principles of personal conversation.

Format Important—Probably the next most important feature should be the form, format, and paragraphing of a letter. Here, the businessman must depend upon his secretary's cooperation. Certainly, the executive must emphasize to his secretary that a letter is a salesman: As the company putting its best foot in the customer's door, the letter must always present a neat, balanced appearance. Business executives who complain that their secretaries do not know how to transcribe a letter should understand that first, secretaries usually learn in business schools several obsolete letter forms as well as the modern block form, and that second, every executive has the same responsibility to his secretary as to his other employes. He must let her know the quality of work he expects her to produce, or he will not get the quality of work he wants.

Unless the executive dictates his own paragraphing, he should remind his secretary that readers of letters, like readers of advertising, appreciate "white space." Hence, a paragraph in a letter should usually be shorter than a typical paragraph in this magazine, in a text book, or even in a news story. The opening paragraph especially should be short and concise; if possible, it should give the reader a thumbnail sketch of what the letter concerns.

The secretary should also learn, if she does not already know, how to center the letter on the effective page (the page excluding the letterhead and any printed matter at the foot of the stationery). Usually, the left margin should be about 18 elite typewriter spaces wide (about 1½ inches), and the average right margin about the same. However, if the secretary has a typewriter which permits justifying the right margin—making all the lines come out flush—the right and left margins should be about equal.

Keep It Short—Finally, the executive should eliminate unnecessary wordage and wherever possible limit his letters to one page. Often, he can save space by preparing a rough outline of what the letter will contain *before he begins to dictate.* At least, outlining will usually accomplish two objectives: eliminating extraneous ideas and forcing the dictator to present his thoughts more concisely.

Concise writing is extremely important in preparing business letters. Far too many executives think about what they will say only after they begin to dictate. "Goozling," using the old stereotyped expressions of Victorian correspondence, usually results. For example, a goozling mind would produce the following paragraph:

> I am in receipt of yours of the 16 inst., and I beg to inform you that this letter will be the acknowledge-

ment of your application for credit account.

The executive, gazing out his office window, vainly tries to devise an appropriate opening remark. Because his ingenuity fails him, he takes the easiest course (he thinks) by uttering sentences—noises—which really show no thought. The same executive would vehemently deny that he talks that way; and indeed, he probably does not goozle in conversation. Instead, over the telephone he would probably tell Mr. Jones something like this:

> I'd like to thank you very much, Mr. Jones, for your letter of March 16, in which you applied for a credit account.

Little imagination is required to avoid goozling. Usually, avoiding goozling and being natural and friendly are complimentary aims.

Even worse than occasional goozling (which shows merely that the dictator has not caught up with modern methods) is the rudeness some dictators unconsciously display. For example, the phrase "You claim in your letter . . ." seems harmless. But it casts doubt on the reader's veracity or sense of propriety. Equally as irritating is the implication that the reader has no sense of reason: "You ought to realize that we cannot extend open accounts to a customer with his first order."

Final Test—Finally, the business letter must pass an acid test: Will it gain the desired results and still retain the reader's good will (unless the letter is the last of a collection series, of course)? If the dictator has carefully dictated the letter with the reader in mind; if he has trained his secretary to preserve the neat appearance that every reader has a right to expect; if the letter is clear and concise with a minimum of wasted verbiage; and if the letter will not offend the reader through unintentional implications; then the dictator may feel certain that it will be read and that it will probably get results.

Public Speaking Weighs Heavily—Probably every white-collar worker, as he starts up the ladder of management, observes incongruity between what he learned in high school, technical college, or university and what he observes in actual business practices. For, contrary to what most of his teachers may have said, technical knowledge of a job is not enough. Almost any organization employs men with plenty of brains and education who have only partially succeeded. Somehow, being able to speak effectively, among other qualifications, often weighs as heavily in promotion as do diligence, hard work, and skill. For American businessmen are talkers, and the American executive must be at ease around a conference table or on his feet in front of a group.

Any speaker should understand that before he can speak effectively, he must know just what his listeners expect. In a group meeting, in a conference, or on almost any occasion, the listeners expect that the man who is talking will display four characteristics:

Worthwhile information
A concise presentation
An interesting presentation
A logical approach.

A speaker must compete with distractions, the natural inattentiveness, the individual worries, and the limitations of listeners. Therefore, he must usually convey worthwhile information. (The industrial speaker seldom speaks to entertain.) Moreover, because the speaker competes with distractions and other interests, he must offer his facts and opinions concisely and interestingly; an audience will usually tolerate even disagreeable opinions, but it will not accept boredom. Finally, most listeners expect a logical approach to any serious subject.

Be Prepared—Nearly any speaker can meet these requirements by ample preparation. The speaker, before he arrives in the conference room, and certainly before he begins to speak, "gets his ducks in a row." If his discussion hinges on existing legislation, he checks the law or interviews his legal counsel. If his thoughts will concern past records, he checks his own or the corporate files. If he expects disagreement from his fellows or his subordinates, he plans to reconcile disagreements while he is talking. He never permits himself to appear unprepared. The speaker who "talks himself out on a limb" arouses at the best pity and at the worst scorn.

As in almost all communication, making an outline is a safe procedure in public speaking and conference leading. An outline insures adequate preparation and a logical approach; an outline frees the speaker's mind so that he will probably present an interesting talk. To a conference leader his outline is most vital because it enables him to cover all the necessary subjects, to allot the proper amount of time to each subject, and to prevent the conference from disintegrating into an unproductive "bull session."

Any speaker, whether leading a conference or serving as the main speaker before a gathering, should try to avoid any irritating mannerisms. Mannerisms of voice control are especially difficult to overcome, but two other distracting habits can be easily avoided; the "and-er" habit and the habit of "fiddling" with keys or other gadgets.

Finally, the audience wants a speaker to organize his thoughts before he begins to speak. Any educated audience rightly expects a speaker who consumes its time to assume an attitude of calm, confident competence.

Technical writing—The growth of complex line and staff organizations in almost all industries has necessarily involved intra-company "paper-mills." Because in a large industry the individual department often functions almost as a separate business, executives frequently write communications between departments. Especially, top management passes along written orders and directives. This growth in paper work demands that countless hours of payroll time be spent in reading; consequently, top management in almost any industry places a premium on skill in technical writing.

All technical writing, whether it represents recommendations, directives, job instructions, abstracts, progress reports, proposals, progress summaries, or investigation reports, should display four characteristics:

Conciseness and economy

Completeness
Logical order
Observance of grammatical and industrial conventions.

The advice to prepare an outline in planning any written or oral presentation of thoughts and facts applies even more to the technical writer's work. However, the outline assumes two stages in the technical report. First, the writer prepares a rough outline based upon what he already knows about his subject. This rough draft might be compared to the large scale chart a navigator of a ship uses before he begins to plot his detailed course.

After he has prepared his rough outline, the writer gathers his necessary data. Gathering his facts carefully will save the writer from embarrassment, for certainly nothing places a writer in a more unfavorable position than ignoring a pertinent company directive, a clause in an applicable union contract, a federal law, or a previous report. To help industrial writers, some plants maintain engineering libraries. *The Reader's Guide to Periodical Literature* and bibliographies of governmental publications may also prove valuable. Finally, almost any technical report should involve a survey of the various company manuals and discussions with the concerned supervisors or foremen. Meticulous attention to the facts embodied in his report will earn for the writer the reputation of never going off "half-cocked" — of always organizing his facts.

Use Logical Order—His schedule usually permits the writer to make certain that this rough outline, in the light of his research, displays logical order. Nothing impresses a superior or a customer much more than does a report which evidences logical organization. If the report summarizes developments, the narrative form, with the details in chronological arrangement, usually serves best. A recommendation, usually has this arrangement: recommendation, reasoning, answers to objections, and summary. Like the summary report, job descriptions or instructions should usually follow chronological order through a step-by-step account of what action the reader should take, with reasons given wherever possible.

Next, the writer prepares a rough draft. Beginning writers frequently slavishly observe the rules of grammar; and, indeed, observance of grammatical convention is expected of every responsible writer. But no writer should concern himself with grammar or the niceties of expression until he has completed a rough draft. In the rough draft, ideas alone should concern the writer. For instance, in the rough draft, if the writer inadvertently uses a plural verb with a singular subject, he should not divert his attention to correcting this minor error until he has completed his draft.

After he completes his rough draft, the writer edits it for conciseness of expression and for observance of convention. He should particularly try to eliminate all of the wasted words. For example, the following expressions usually have more economical equivalents:

Wasted words	Equivalents
In spite of the fact that	although
Because of the fact that	because
Can and will	will
In the checking of	to check
Should this contingency	if this happens
In any eventuality	always
Under these circumstances	therefore

Almost any piece of technical writing will be read either by a superior whose time is worth more than the writer's or by a group of subordinates whose collective time is valuable. Hence, the technical writer recognizes that rapid, sloppy writing usually means slow, costly reading. He never ignores the opportunity to omit padding or unnecessary phrases, for the best formal business writing is "long on ideas" but "short on words."

Of course, conciseness must not run to an extreme. Telegraphic English belongs in telegrams and not in reports to one's superior. The technical writer should not strive for conciseness by eliminating the necessary "a's," "and's" and "the's."

The number of drafts through which a writer puts his report will depend upon two considerations: the importance of the report and the amount of time he can devote to the report. In writing any important report, the writer needs sufficient time to prepare a second draft; for a second draft will give the typist a clearer copy from which to copy the final draft. No matter how many drafts are prepared, the writer must accept responsibility for the copy which is submitted.

The writer's responsibility is a subject which itself merits comment. Many writers in business assume an attitude of "I'll let my typist worry about that." Such an attitude is both unwise and unrealistic. For whoever aids in preparing the final draft, the report in its final form is the writer's inescapable responsibility. If the report contains typographical errors, or if the typist has juxtaposed ideas or sentences, the writer must accept whatever consequences may result.

Timing Factor — As in nearly all other activities, timing is important in submitting a report. To submit a recommendation critical of present operations when the writer is not matching his own work schedule will probably earn a superior's disfavor. Taking care of first things first is sound advice.

Briefly, then a technical report must evince

Mature judgment
Careful marshalling of facts
Consideration of the reader's time
Preparation
Obedience to conventions
Proper timing

No matter how brilliant its conclusions, the report which does not show these qualities will probably fail of acceptance. And, conversely, even a report which cannot convince the reader of its conclusions and recommendations will merit the reader's respect if it does measure up to these criteria.

Summary—The basic tenet of this series should by now be obvious: mere generation of ideas, or simply mastering the technical details of one's position is not enough. Just as a "coming" executive gives attention to his manners, his clothes, and his bearing toward others, so must he develop his skill in communicating his ideas to superiors and subordinates.

—The End

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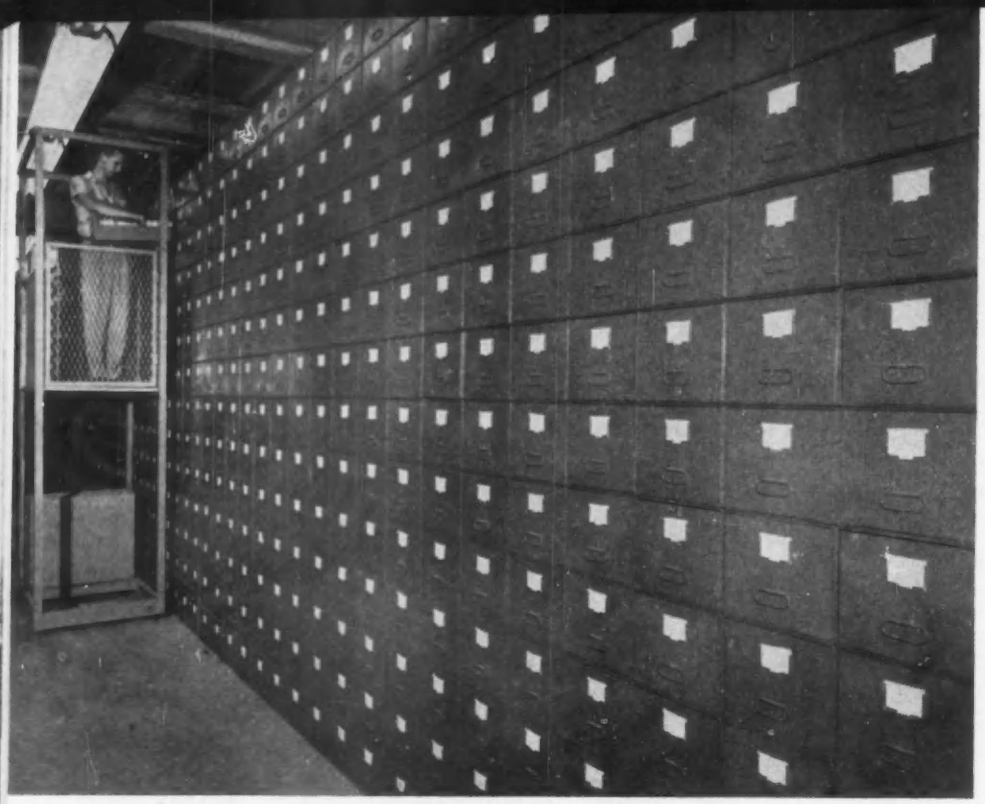

INTERIOR VIEW of Warren Petroleum Corporation's special records building. It shows metal transfer cases with interchangeable drawers, and specially designed file lift for greater convenience in handling records.

Putting New Life Into Dead Records Program

Here is a system that provides definite procedure for keeping, using and discarding records.

By EUGENE C. ALFORD, Assistant to Secretary,
Warren Petroleum Corporation, Tulsa

THE COMPLEX modern business world is literally built on paper.

Companies must keep records, but unfortunately, many do not establish a program of orderly destruction and retention to meet the needs of the years ahead. Consequently they accumulate a lot of "dead records," which have no real significance to the company's operations. On the other hand, a periodic relief through a disorganized culling of records may result in serious inconvenience, and might in certain cases prove disastrous.

Some four years ago Warren Petroleum Corporation was confronted with the problem of what to do with a large accumulation of such records. For years these records had been stored in cardboard transfer cases, stacked on wood shelvings until they were filled, then were tossed helter-skelter wherever space could be found. This condition discouraged a department from consulting its previous records except at times of extreme desperation, when it would make a determined and frantic search, which simply added to the chaos.

The first step taken to bring these "dead" records to life was to commence simultaneous programs of . . .

- Analyzing the large volume of records to determine their retentive value.
- Shifting the transfer boxes to segregate them according to their contents.

The company soon constructed a special records building a short distance from its offices and equipped it with metal transfer cases having interchangeable drawers, a specially designed file lift, and an office for use by employes and auditors who find it more convenient to go to the records than having the records delivered to them.

The procedures established to administer the transfer and storage of records were designed to achieve simplicity, flexibility and acceptability. Only four forms are used in the program.

The Records Transfer and Inventory Form is the only form that other departments are asked to prepare. It is itemized as detailed as practicable. Itemization not only avoids differences later as to whether a particular record was transferred, but also distributes the work load of preparing the inventories throughout the company instead of concentrating it in a single department. The form is prepared in triplicate. Each sheet is given a number, for example: 9-100. The number 9 indicates the department and the number 100, the page. This is a reference number which helps the department to identify the records it subsequently needs.

The first copy of the Transfer and Inventory Form is filed according to its reference number and becomes the inventory of records by departments. The second copy is filed according to the specific record and becomes an inventory by records. In effect it is a perpetual inventory for each record. The third copy is filed in the department by reference number for the department to consult.

A number which indicates the location of the record is posted to the first and second copies of the transfer sheet. Thus there are two ways to locate a record when needed. If the department reference number is cited, reference to the copy of the transfer sheet filed by such numbers will determine the location. Otherwise, the location is determined from the copy of the transfer sheet which is filed and indexed according to the name of the record.

This system of inventory has another important aspect. With it, there is no necessity for allocating any portion of the storage area to any department, or for reserving any space for future records of the same kind. It is

Pulled after 4½ years in a sour well

—corrosion negligible

These Monel valves served 4½ years in a sour crude well. When they were pulled, they showed practically no corrosion.

Here's the story of seven veteran Monel® gas-lift valves.

These valves, made by GARRETT OIL TOOLS, INC., gave excellent service for 4½ years in a well producing sour crude.

Careful examination showed the valves to be in excellent condition. Years of exposure to highly corrosive well fluids had produced only negligible signs of attack.

With service records like these, it's no wonder that Monel has become the standard material for all GOT gas lift valves.

GOT made their first pressure charged gas lift valve in 1946. Some of them have been in continuous service as long as 6½ years.

The reason for this lo[illegible]ervice lies in the combination of the right material and co[illegible]ect design. In addition to all-Monel construction, for example, the seamless bellows — the very heart of the valve — is given extra protection against excess pressures, distortion and contamination. It is supported on the inside by a valve stem guide ... and on the outside by a non-compressible liquid. This extra protection permits higher pre-charged dome pressures without damage to the bellows.

A pressure-charged dome replaces the pressure-charged bellows to hold the valve in closed position. The dome pressure can be changed in the field, permitting easy repair of valves as needed.

The fact that all types of GOT valves are interchangeable on one basic body reduces obsolescence and permits smaller inventories. Operators can thus easily convert their original valves to other types as well conditions change.

You can get detailed information on GOT valves by writing to Garrett Oil Tools, Inc., 2600 Nottingham St., Houston 5, Texas.

And remember, you can always call on Inco's Corrosion Engineering Section for help with your particular oil field corrosion problem.

It is advisable to place equipment orders with your supplier well in advance of scheduled use. Distributors of Inco Nickel Alloys can supply the latest information on availability from warehouse and mill.

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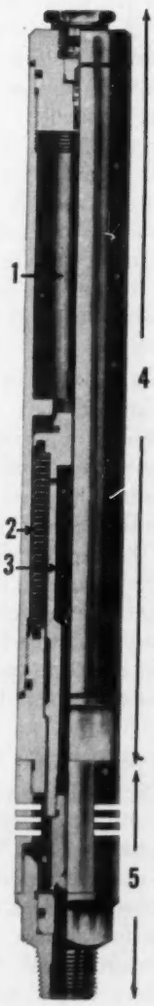

1. Dome
2. Bellows
3. Valve Stem Guide
4. Type "O" Body
5. Type "O" Head Piece Assembly

Cutaway view of the Type "O" GOT Pressure Charged Gas Lift Valve. The body and the internal parts are made of corrosion-resisting Monel.

Inco Nickel Alloys

Monel... *for minimum maintenance*

nearly impossible to anticipate future storage requirements. One either overestimates, with excess space not being utilized, or under-estimates and eventually loses the physical segregation of the records. This system permits maximum utilization of storage area, as any vacant "location" can be used for any record. While this practice results in records of a certain kind being filed in various places in the storage room, they are always kept together "on paper" in the office.

Another form in a Request for Records sheet which is prepared for each separate request. Other than the name and department of the person who needs the information, its most important feature is the reason for the request or the purpose that the record will serve. As these sheets are ultimately filed for future reference, they are an excellent source to determine the factors to be considered in establishing the period of retention. When the request is filled, the request sheet is placed in a follow-up folder and regular periodic inquiry is made to determine if it is still needed. This prevents many records from being mislaid or filed with current records and shows when such records are handed from person to person and department to department. When the record is returned, its return is recorded, and the sheet is filed for future reference.

Planners of a record storage and retention program should aim at a minimum of paperwork procedure, else they can create more burdens than already existed. The program must have the enthusiastic support of the rank and file. If they are burdened with unnecessary requirements they are resentful and uncooperative, and the program efficiency is affected.

In establishing a retention period for records, this procedure should be followed:

First, talk to the person who originates or processes the record to determine its objectives and purposes and its relationship to other records. Next, talk to each person or department receiving a copy or to whom data computed from it is forwarded. The department's procedures and filing system is learned. If a record or the information it contains is merged in another record the chain can be followed to the ultimate disposition of the record prepared from it. In the process the part each record plays in the company's operations is determined and it can be intelligently evaluated as to importance in relation to other records. When this analysis is completed, the disposition that should be made of several records reveals itself. The retention period is actually a composite recommendation of all personnel interested in the record, and with exceptions, the person with a need for the longest period determines the retention period to be recommended.

About the Author

EUGENE C. ALFORD was born in Mena, Ark. He obtained a degree in law in 1953 from the University of Tulsa. His first assignment was as office messenger in 1936 with Mid-Continent Petroleum Corporation, Tulsa, and he remained with that company until 1948 when he had advanced to the position of secretary to the president. The same year he joined Warren Petroleum Corporation, Tulsa, as assistant to the secretary, the position he now holds.

Written recommendations on a Retention Policy Sheet, to which a specimen copy is attached, should be presented to the department heads individually and not to a committee. If the department manager approves, he signs the recommendation. If he knows of an unanticipated situation for which the record should be kept longer, the recommendation is changed. Eventually these recommendations are presented to the legal department, and if approved, the Retention Policy Sheets are reviewed by the Corporate Secretary. It is his signature that authorizes the retention period.

The policy sheets contain a concise statement of the salient facts and factors which determined the retention period, the method of disposition for certain records, and, most important, whether the record can be destroyed at the end of the retention period without further authorization, or if written authorization is required from all departments concerned with the record. Few records are destroyed without written authorization.

At expiration of retention period, a Destruction of Records Authorization Sheet is prepared and reviewed by the department heads and the legal department. Controversies, claims and litigation frequently arise in the interim. If records are automatically destroyed at expiration of the retention period without a review, considerable loss may result. If no complications have occurred, then authorization to destroy is given by the Secretary.

The period during which a record should be retained is largely a matter of individual judgment except when there are definite guide posts, such as Statutes of Limitation and federal or state governmental regulations. The retention period should be based on the criterion of future need and whether the probability of such need will justify the cost of storage, protection, and handling necessary to keep it readily available, either in original or photographic form.

A realistic record retention program should chart a course that neither founders on the "hoarding theory," the tendency to keep records too long, nor the "spendthrift theory," the tendency to discard old papers without regard to their values. How can the period of retention be determined when there are wide and divergent differences in opinion? The only solution is to compromise, so that the program can get started.

The frequency that a record is referred to will help in arriving at the retention period. Whether it is admissible as evidence is an important factor. A vital or important record is a most difficult thing to define, although certain records are easily recognized as being highly important.

Classification of records gives some a reputation of being worthwhile, which being richly deserved at the time is short-lived.

The combining of reports that tend to duplicate each other saves storage space and, in many cases, the time and expense of filing. On multiple copy records, the retention policy should indicate the department that is responsible for maintaining the official file copy. Other departments then

Continued on Page 84

In Stanolind's safety program . . .

Emphasis Is the Answer

By D. A. KLEMME, Safety Supervisor, Stanolind Oil and Gas Company, Tulsa, Oklahoma

WHAT IS an accident prevention program?

Twenty-one years of experience in accident prevention has led Stanolind Oil and Gas Company to define it as:

A course of planned action to eliminate human suffering and property damage.

This sole definition constitutes the basic principle.

A breakdown of the definition reveals that an accident may occur without injury to a person or without damage to property.

Stanolind, which was formed in 1931, two years later established a department to handle personnel and safety work. In 1936 a Safety Section was set up to concentrate on accident prevention in the company. While management is solidly for accident prevention, of course the carrying out of a successful program rests with line, staff and field personnel.

Planned action in an accident prevention program includes:

- Creating and maintaining active interest in the program.
- Getting the facts.
- Taking corrective action based on such facts.

The principles are not based on theory, but are results of proven practices. Many methods and techniques are needed to carry them out.

Initial action taken by Stanolind—other than merely saying accidents were to be avoided so "be careful and don't get hurt"—was to establish first aid training over the organization. At the same time, safety meetings were begun. Through these efforts basic principles were emphasized, and were further developed by using other techniques, such as demonstrations and reciting accident experience. These are designed to make people think.

In recent years other methods added have been driver training, supervisory training, and definite instruction on particular problems and hazards.

But this was not sufficient. It became necessary to place special emphasis on following up these methods and techniques to determine their effectiveness.

It was found that the follow-up was an important factor and was necessary to motivate people. Therefore, the line supervisor becomes the most essential part of Stanolind's program; responsibility of the program from the top to the bottom of the line rests squarely on his shoulders. The line suprevisor needs the most help and deserves the most credit for carrying Stanolind's program. This is why Stanolind has asserted that the program will be successful as long as there is constant safety education through supervision.

To carry out the principles and practices in Stanolind's program:

- All management and line supervisory personnel must be sold on accident prevention and must support it through their actions and leadership.
- There must be confidence in the safety staff.
- The safety staff must be qualified and believe in the work it is doing, for it is the safety staff's job to motivate actions of others toward accident prevention.
- There must be a real and continuous understanding of human relations. All, regardless of their jobs, must accept individual responsibility in carrying out the principles of accident prevention.

Stanolind's program objectives are:

1. To prevent accidents.

2. To eliminate as much as possible the suffering that would result from accidents.

3. To save money by preventing waste resulting from accidents.

4. To improve working conditions through "good housekeeping" of property and efficiency. Improvement as individual workmen and as supervisors is sought and, above all, safe working practices are developed.

Further objectives are being developed through supervisory training for accident prevention. This training consists of actual job planning against accidents and planning and conducting safety meetings to instill principles of the program in employes. And this training includes accident analysis to determine the actual basic cause of an accident, or more important, the hazards involved in work that might result in an accident.

On-the-job instruction is another important phase of supervisory training. At this point the supervisor actually explains and demonstrates to the employe the "how" of his job. The supervisor's initial contact with a new employe is most important. He must be capable of properly indoctrinating the new employe so basic principles and fundamentals relative to accident prevention are made clear. Only the supervisor can properly accomplish the desired results.

Objectives are further developed by Stanolind's ability to recognize accident hazards. This progresses through observation of work practices and working conditions, by surveys of equipment and property.

Basic principles, essential fundamentals, objectives and their development constitute the company's basic program. But there are other phases in accident prevention that are outside the basic program. For example, physical examinations are important from the employment standpoint. Also, they help in proper job placement.

Compensation laws, of course, enter into Stanolind's program. It is necessary that the company adhere to various states' laws as specified by their compensation regulations. These laws make reporting of accidents mandatory.

In addition to compensation laws, regulations and codes govern construction and work actions in company operations. These regulations and codes are known to the specialists who plan construction projects and equipment design so that the chances of negligence on the part of the company are ruled out.

While both line organization and safety staff organization are involved

in the accident prevention program, it is the responsibility of the line organization to carry out the accident prevention program. They have the authority in its application. The safety staff is advisory and has no authority —it is merely a helping hand to the line in accomplishing its goal.

Stanolind's Safety Section, a part of the Industrial and Public Relations department, is headed by the safety supervisor. He works under the direction of the industrial relations superintendent. Each of the four divisions has a Safety Section, and there is a safety representative in the Research Department. The safety staff in the divisions and at the Research department have a staff relationship with the safety supervisor in the general office, making a direct line of communication on problems involving accident prevention policies.

Originally, safety staff activities were supervised out of the general office. The safety sections were organized in the divisions as well as in the Research department, insofar as field work was concerned, after 1945. Recently, record-keeping has been decentralized, making a complete Safety Section within each division. This decentralization has proved satisfactory in that it gets advisory help closer to field and plant line supervision.

Stanolind's accident prevention program also has a basic formula. It is easily remembered and can be applied to any problem. It is referred to as:

—The End

Pattillo Higgins Had Faith in Oil's Future

June 6, at 92, the discoverer of Spindletop and founder of the modern petroleum industry died leaving behind a fabulous story of determination and faith in the oil future of the Texas Gulf Coast.

Pattillo Higgins

Pattillo Higgins, son of a Beaumont gunsmith, first predicted in the 1890's that wells producing tens of thousands of barrels of oil a day would be found at Spindletop. Despite frequent condemnations of the area, he persisted and formed the Gladys City Oil, Gas and Manufacturing Company with George W. Carroll and Capt. George O'Brien. The company drilled three wells, all failures.

After losing virtually all of his interest in this company and most of his own acreage on "the hill," he interested Capt. Anthony F. Lucas with an advertisement in a mining magazine. Lucas' first try was a failure. Guffey and Galey Company later came to Lucas' aid, leaving Higgins out of the deal, and the 100,000 barrel-a-day Spindletop gusher was brought in.

Higgins formed the Higgins Oil and Fuel Company, which was purchased by the Houston Oil Company, and later, in 1901, the Higgins Standard Oil Company, which failed as the public lost faith in any Spindletop "promotion." But oil was found in great quantities everywhere Higgins had had a lease.

Throughout his life, Higgins continued his search for oil. A natural geologist, although possessing only a fourth-grade formal education, he continued studying geology and related subjects and was known for an uncanny ability to spot potential fields. Hockley Dome and Barbers Hill were two of his major discoveries, following what he called "nature's signboards."

Higgins is said to have predicted virtually all productive oil fields in South Texas before their discovery. During the golden anniversary of the Spindletop discovery, he stated that there was still billions of barrels of oil to be found by a petroleum industry still in its infancy, and that every acre of land between Houston and New Orleans was potentially oil country.

Dead Records

Continued from page 78

can destroy their copies when they find that such copies are no longer useful. Thus any necessity of further handling is eliminated at the department level.

When the records manager, or whoever performs as such, has finished analyzing each record in the company, he will have a wealth of valuable knowledge of the entire company's records, procedures, and overall operations that prove valuable to other departments faced with the preparation of special reports.

The mass of records to be retained can be greatly reduced by:

- Preserving the technique of preparing cost data and production data rather than records containing outdated calculations.
- Filing separately the memos and reports on which decisions and directives are based, instead of having such records lost in the bulk of retained records.
- Eliminating from correspondence files letters of transmittal, "thank you" notes, follow up letters, and other non-essential correspondence before it is transferred to storage.
- Writing detailed reports on development of a project, the problems encountered and how they were solved, and incorporating any cost or technical data that influenced the ultimate decision.
- Summarizing the growth, experiences and development of the company through detailed reports prepared annually by departments.

Such practices will do a better job of preserving the company's experiences than the maze of miscellaneous records that are created. The important decisions on many matters are usually made in conferences, and consequently the records that a company should have were never created in the first place. —The End

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Because casing strings are heavy and relatively thin-walled, they are vulnerable to deformation. Therefore, it is important that the supporting slips insure a safe, full-circumferential grip on the casing to prevent distortion. Baash-Ross Type "UC" slips eliminate the problems caused by conventional slips because . . .

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. . . the slips specifically designed for safe casing support!

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The ghost at the wedding

Tougher Stand on Mergers Threatened

FTC report neither condemns nor condones wave of corporate marriages, but Congressmen quick to ask for legislation curbing practice.

POTOMAC POLITICIANS disentombed a tired old ghost from the Truman administration last month with the intention of turning it loose at the weddings of U. S. business firms.

In the wake of a report on a Federal Trade Commission study of mergers, Congressional committees began a long-brewing investigation based on the precept that it's bad to be big and therefore worse to get bigger.

If the probes were timed with the expectation of picking up ammunition from the FTC report, the probers had reason for disapponitment, for the weighty (233-page) tome, months in the making, avoided saying flatly whether the current wave of mergers is good or bad. The report studiously avoided a recommendation for legislation to curb mergers, thus forcing the probers to manufacture

CHANGING PANORAMA

their own indictments. One such was a bill introduced by Sen. Sparkman (D., Ala.) and given stature by the endorsements of Assistant Attorney General Stanley Barnes, in charges of the Justice Department's antitrust division, and FTC Commissioner John W. Gwynne. Sparkman proposed that large firms be prepared to give both the Justice Department and FTC 60 days' advance notice of any proposed merger or sale.

This struck Gwynne as a "not unreasonable" proposal, but there were those quick to retort that FTC, being not quite omniscient, could not correctly foretell in every case whether a merger would lessen competition, thus violating the Clayton Act. Cases in point were the Nash-Hudson, Kaiser-Willys and Studebaker-Packard mergers. All are now considered to have been well-advised unions permitting these companies to compete better with the Big Three of the auto

Continued on Page 90

When government weighs a merger . . .

Here are the factors weighed by Attorney General Herbert Brownell in deciding whether to oppose a merger:

- The location, physical and financial size, past acquisitions, products, and activities of merging companies, individually and in combination.
- The structure and size of the industry in terms of production and capacity.
- The relative position in the industry of the two companies individually and combined.
- The ease by which new competitors may enter the industry.
- The number of companies active in the industry, their respective size and relative standing in sales and total assets.
- Sales, relative standing and like factors of the two companies and their competitors in definable market areas, if relevant.
- The nature of the industry—that is, whether infant, dynamic, or declining.
- The effect the proposed merger may have on sources of raw materials and methods and patterns of distribution.
- Whether the acquisition may result in a significant reduction in competition.
- Whether the acquisition may increase the relative size of the purchasing company in such a fashion as to give it a substantial advantage over its competitors.
- Whether the relationships between the purchaser and other companies that may be brought about by the merger might result in a lessening of competition.

. . . it ought also to consider these principles . . .

Earl Bunting, honorary vice president and former president of the National Association of Manufacturers, told a House judiciary committee that government ought to apply these principles in the antitrust field:

- Competition in any field should be judged on the basis of its actual operation and not on the basis of artificial theories of perfect competition.
- Business growth through productive efficiency and aggressive marketing practices should be recognized as normal in a free economy and should not in itself be recognized as an attempt to monopolize.
- Similarity of pricing practices should be recognized as among the natural results of competition and should not be recognized in themselves as evidence of collusion.
- The government should recognize that competition inevitably means that some competitors will not make the grade and should not attempt to guarantee all firms against injury from the action of competing firms.
- Monopolistic practices by unions should be subject to regulation just as much as monopolistic practices by employers.

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WALL SCRATCHER

that removes mud cake effectively...
but only from the area to be cemented

MODEL "C"
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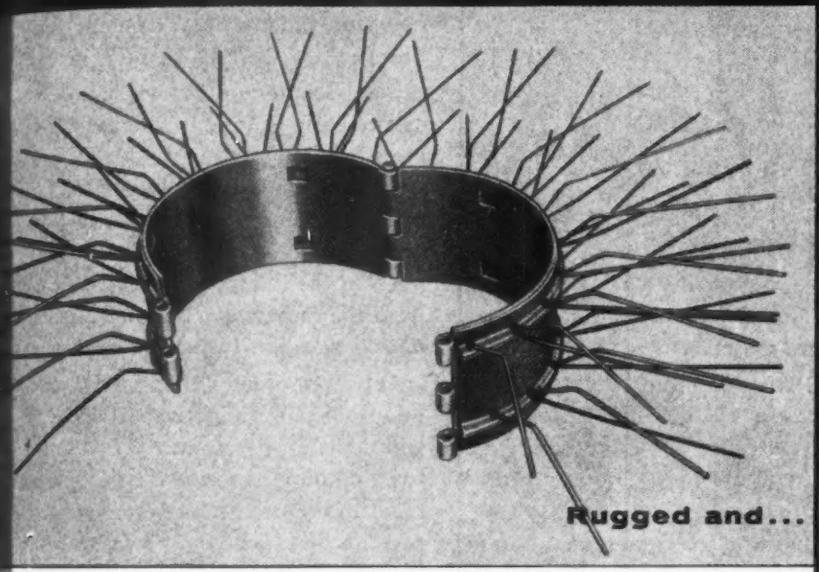

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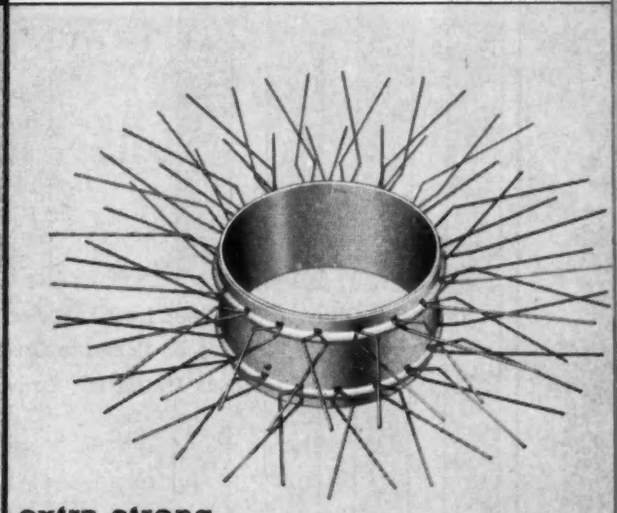

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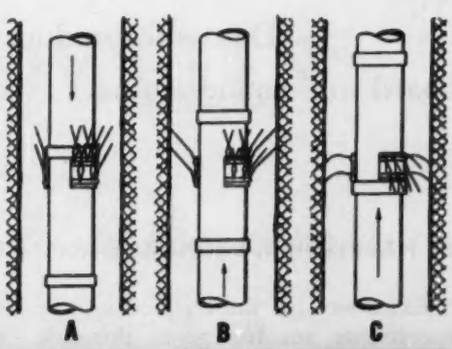
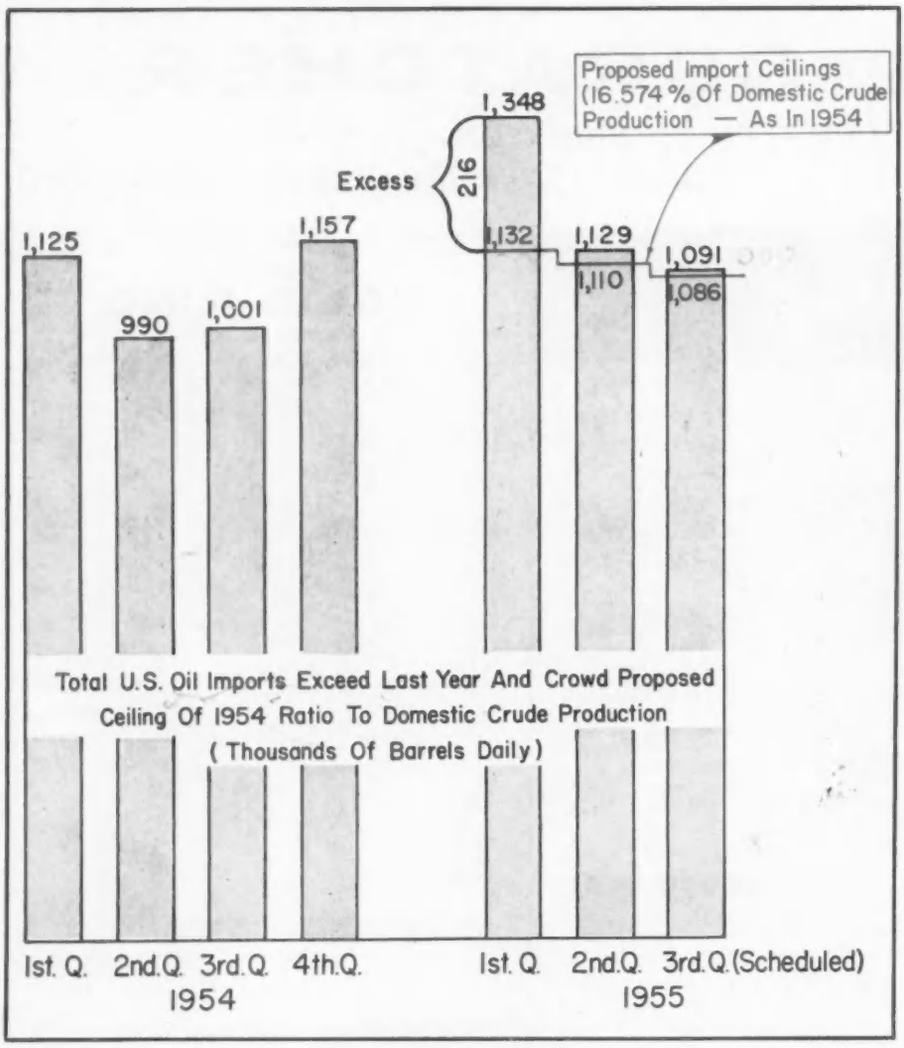


BAKER
WALL SCRATCHERS



Trade Act Lets President Put Limit on Oil Imports

Domestic producers now have a legal springboard to demand action.

By **HARRISON T. BRUNDAGE,** WORLD OIL Staff

EXTENSION of the reciprocal trade agreements act has given domestic producers a legal criterion and a specific standard that they have not heretofore had available to protect their interests. The bill includes a specific provision empowering the President to restrict oil imports to a level that he feels will not jeopardize national security.

Congress has lent its endorsement to the report submitted by the Cabinet Committee on Energy Supplies and Resources recommending that future oil imports should not be allowed to exceed their 1954 ratio to domestic crude production. The President expressed approval of the bill prior to its passage by the House. Recognition by both Congress and the president of the seriousness of the oil imports situation has given rise to optimism on the part of several spokesmen for independent domestic producers.

The Senate and House conferees agreed early in June to submit to Congress for final passage a three-year extension of the Trade Agreements Act. The specific provision authorizing the president to curb excessive oil imports in the interest of national security is the most important modification of and addition to the previous law.

It is very likely that independent oil producers and the coal industry will demand presidential action to restrict oil imports to the ratio they bore to domestic production last year. Reportedly, the coal industry already is planning such an appeal to the Office of Defense Mobilization. The President's Cabinet Committee is said to be reviewing current import figures to determine if such action is needed.

Oil imports reached an all-time high of 1,347,600 barrels daily during the first quarter of 1955. This rate was 216,000 barrels greater than if the imports had borne the 1954 ratio to domestic production. In 1954, total imports amounted to 16.574 percent of the total domestic crude production figure for the same year.

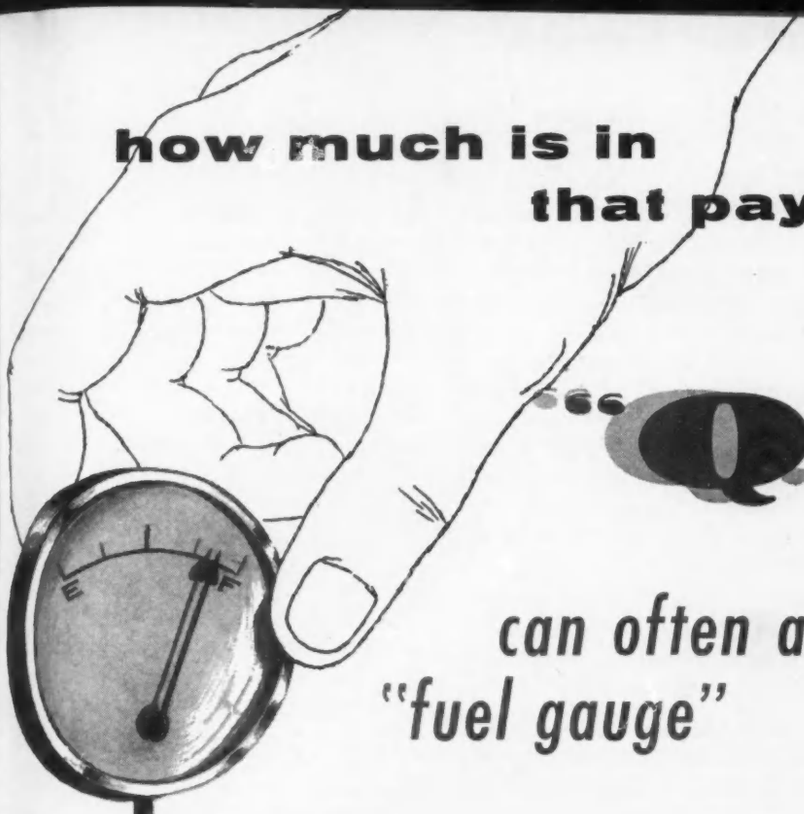
Walter S. Hallanan, Plymouth Oil Company president and National Petroleum Council chairman, said in Pittsburgh June 9 that "some measure of relief from the adverse affects of imports on domestic producers may be closer at hand than we anticipated."

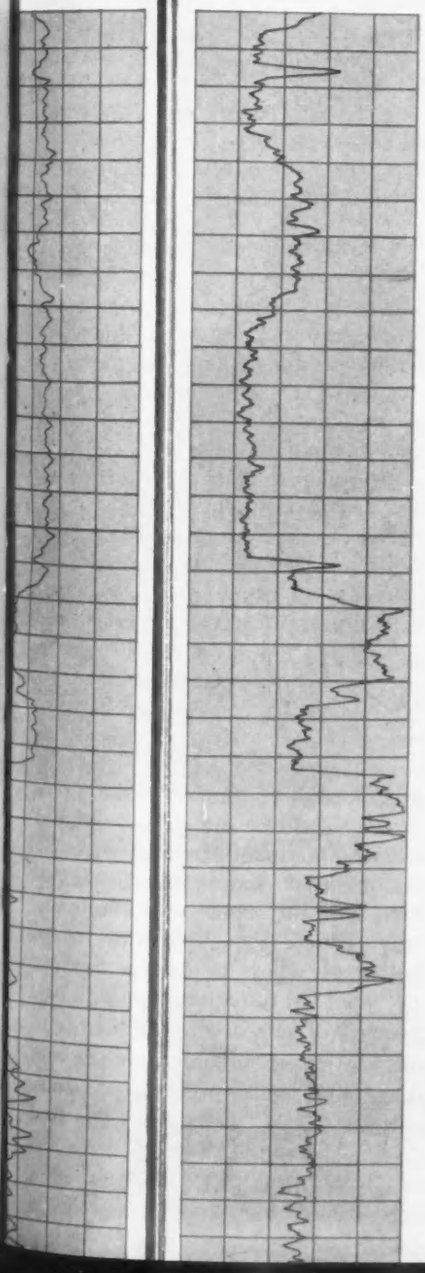
Some basis for this optimism reveals itself in the April 1955 imports data reports filed with the Texas Railroad Commission by the importing oil companies and their forecast through September 1955. Imports are expected to be 1,129,100 barrels daily during

how much is in that pay zone?

"Q.I."

can often add the "fuel gauge"





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the second quarter and 1,090,600 the third quarter. If schedules are followed, a decline in imports of 257,000 barrels daily is evident between the first and third quarters.

Based on WORLD OIL's U. S. production forecasts for the second and third quarters of 1955 and on the import schedules filed with the Texas Railroad Commission, excess imports are expected to drop to 19,000 barrels daily during second quarter and to 5000 barrels daily during third quarter. It would therefore appear that the importing companies are making an effort to bring imports volume into line.

It is true that imports are still increasing percentage-wise over 1954, but U. S. production was estimated by IPAA sources to increase by 4.5 percent this year as compared to last. Since the critical imports level is based on the ratio to U. S. production, imports may rise as domestic production does, provided they do not exceed 16.574 percent of the total domestic crude figure.

If imports were kept somewhat below the critical level, this would tend to compensate for the fact that oil exports from this country continue to decline.

There was a recent cut by one major company purchaser in the price of Kansas crude of 15 cents per barrel. And unrest among domestic producers, based on high imports, has had political repercussions in Oklahoma, Louisiana and elsewhere. Congress has now provided a specific means by which some satisfactory adjustment of the imports situation may be effected.

On June 14, Russell B. Brown, IPAA general counsel, told Oklahoma City members that the Administration should act at once to curb imports if they continue to exceed critical levels. He declared that "there is no need for new studies by committees. This problem has literally been studied to death. The consensus of all studies is that oil imports are too high."

Brown feels that Congress should act to see that the intent of the bill is carried out, if the executive branch delays action in this matter.

—The End

Tough Stand on Mergers Threatened

Continued from Page 86

world. However, when the mergers were projected, it could have been argued that they would decrease competition by reducing the number of auto manufacturers.

And again, it was pointed out, suppose the government had disapproved of the auto mergers and persuaded them to continue going it alone, perhaps to the ultimate bankruptcy of one or more of them? Would this have been to the best interest of the national economy?

The true tests of most mergers, either from a legal or economic standpoint, it was submitted, must come after the mergers take place.

Intent of study. But if this principle seemed clear to opponents of the Sparkman Bill, it was as fuzzy to the FTC as a host of other details which led to the preparation of the report, so that, as Chairman Edward F. Howrey phrased it, all the facts could be considered by Congress, the commission, the Justice Department and other interested agencies to see what should be done about the situation. After all this, the commission "will decide whether, or to what extent, legislative recommendations are desirable," he declared, and indicated that the next step will be a tougher stand by the government on corporate amalgamations and acquisitions.

In attempting to set forth some guideposts to apply to Sec. 7 of the Clayton Act and the 1950 amendment which further restricted merger activity, the FTC study first listed the mergers from 1948 through mid-1954 and then attempted to analyze the reasons behind those mergers.

The study found 387 reported mergers in 1954, which was three times as many as in 1949. Nearly two-thirds of the acquisitions from 1948 through mid-1954 were made by companies with assets of $10 million or more. Firms with assets of less than $1 million accounted for less than 8 percent.

The study found that the largest number of acquisitions in the seven-year stretch were in the non-electrical machinery industry with 249 mergers and in the food products field with 243. Together they accounted for more than one-fourth of the 1773 mergers in manufacturing and mining during that period. The next ten industry groups in which mergers were most numerous were: Chemicals, 168; fabricated metals, 161; transportation and equipment, 125; textiles and apparel, 117; electrical machinery, 111; non-manufacturing, 96; mining, 81; primary metals, 78; stone, clay and glass, 70; and paper and allied products, 60.

The nearest the report came to condemning the merger movement was this statement: "The operation of these forces on a large scale carries with it such adverse economic effects on third parties, and on the economy as a whole, as to bring their unrestrained operation into conflict with existing law." It added, however, that "in policing such situations, there is sound basis for interference with the freedom of either individuals or corporations to acquire or dispose of property only where, on the basis of considered judgment, it can be shown that adverse effects on competition, and hence on the public interest, outweigh the benefits of individual and corporate freedom of action."

Why they merge. According to the study, factors which frequently lead to mergers include the desire for additional plant capacity or diversification of products, and the desire to serve new markets or to gain new sources of supply. Tax savings is another prime mover.

The report had a suggestion as to how the government should test the legality of corporate unions under the law which prohibits a company from acquiring the stock or assets of another when the effect "may be substantially to lessen competition, or to tend to create a monopoly."

"Conclusions concerning the competitive consequences of particular acquisitions cannot be reached on the basis of rules-of-thumb." Thus, every merger should be individually studied to determine its effects on the market and on other companies. Any acquisition, said the report, which substantially reduces the opportunity or incentive of sellers or buyers to enter new markets, to experiment with new channels of sale or distribution, or to exercise choice among products and prices, may substantially lessen competition. **—The End**

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BETHLEHEM STEEL

By **RAY L. DUDLEY,** Publisher, and **WARREN L. BAKER,** Editor

High Runs Could Endanger Outlook

A VERY HEALTHY ECONOMIC POSITION currently is being enjoyed by the U. S. oil industry. Both gasoline and crude oil stocks are lower than a year ago, and consumption is running much greater than in 1954. The favorable gasoline situation is especially encouraging, being in direct contrast with the excessive supplies of motor fuel which have been so troublesome during the past several years.

However, caution needs to be exercised, particularly with respect to crude runs to refinery stills. The situation needs to be watched closely. A big increase in recent weeks has boosted refinery runs to near peak levels. A sharp gain in gasoline output has resulted. Excessive output of motor fuel will lead to serious impairment of the industry's present excellent condition. On the other hand, reasonable refining levels during the next couple of months will maintain the present healthy condition.

•

THE CHIEF DANGER is that current optimism will result in excessive refinery runs and gasoline production. If the big growth in refining levels and gasoline output is an indication of what is to take place in the months ahead, the industry is headed for trouble.

Crude runs to stills averaged more than 7½ million barrels daily during the first half of June, ¼ million barrels above May levels and ½ million barrels greater than in May. Consequently, gasoline production during the first part of June reached an all-time high of 3,668,700 barrels daily, in contrast with only 3,500,000 barrels in May and but 3,411,000 barrels in April. Further growth at this time would be highly dangerous.

The gasoline situation still remains in good condition. High consumption has resulted in further drafts on motor fuel stocks despite increased output. U. S. inventories of gasoline totaled 166¼ million barrels on June 10, or 5 million less than a year ago. This represented some improvement during the past month. A month ago gasoline stocks amounted to 171 million barrels, or 4½ million barrels below the previous year. However, it must be borne in mind that motor fuel in storage needs to be reduced to below 150 million barrels by the end of October, so additions during the low consuming winter months will not be excessive. This will call for heavy drafts on inventories until the end of September.

Some increase in refinery runs and gasoline output was warranted by the very favorable conditions of the past two months. However, the rate of growth has been very sharp, boosting them to near the danger point. Henceforth, the situation needs to be watched closely. If trends indicate output is excessive, refiners should immediately take steps to reduce operations to reasonable volumes. This will keep the industry in a healthy economic condition.

•

THE ONLY WORRY is possible excessive quantities of gasoline. Crude oil production is in good condition, despite record importing and domestic producing rates during the first half of the year. Stocks currently are at the same level as a year ago, although they rose sharply in March, April and May.

The U. S. produced nearly 6¾ million barrels of crude daily during the first half of 1955, an increase of 150,000 barrels daily or 2.4 percent over 1954 volumes. At the same time, imports of crude and refined products averaged close to 1¼ million barrels per day, a gain of 200,000 barrels or 20 percent over the first half of 1954.

Drafts on U. S. crude stocks should take place during the next several months. This will be a reversal of conditions which saw 23 million barrels added to storage between March 1 and June 1 this year. Reduced U. S. production, coupled with higher refinery runs, are expected to not only check the growth in crude stocks but to cause withdrawals.

U. S. crude production in May averaged 6⅔ million barrels daily, 170,000 barrels less than in February, March and April. Production in June will run slightly under the May level, and a big cut in Texas' output is scheduled for July. With refinery runs likely to be higher than in March, April and May, substantial reductions in crude inventories should occur. This will enhance the outlook for crude, and perhaps give U. S. domestic producers some hoped for relief from curtailed producing rates.

Too many soups spoil the cook

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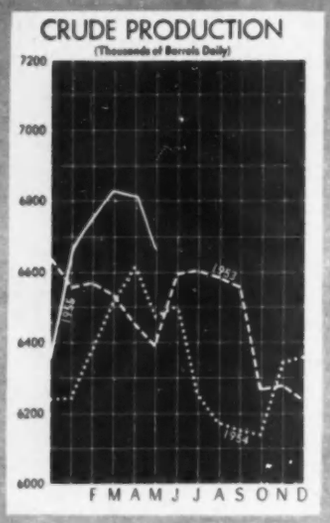
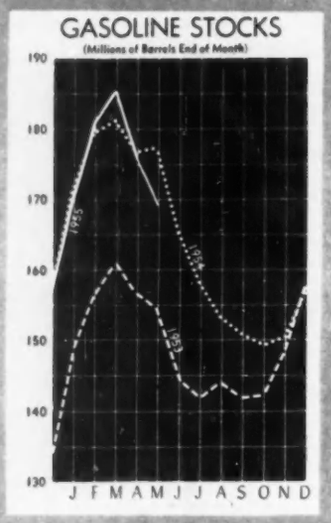
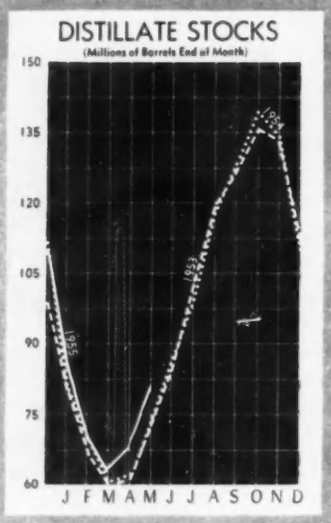
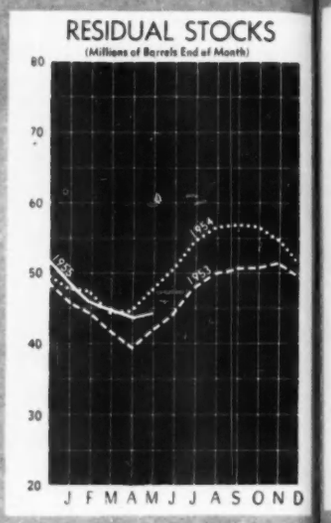
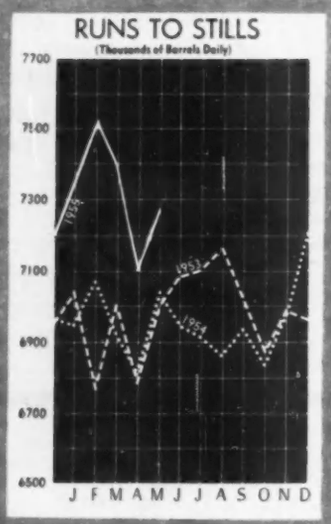
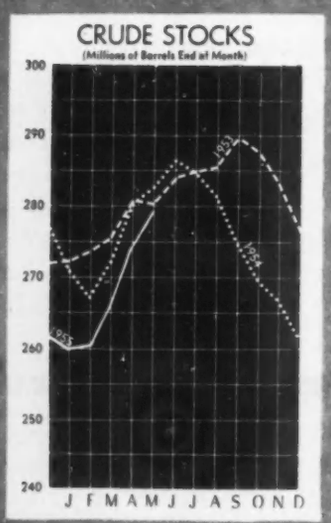












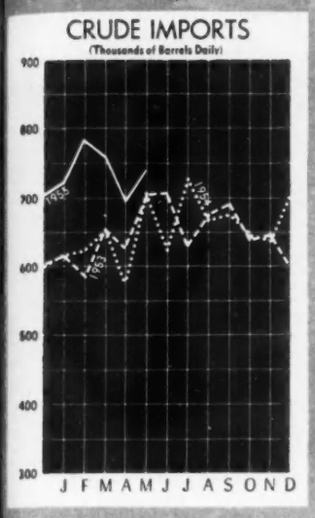
Petroleum Trends in U. S. . . .

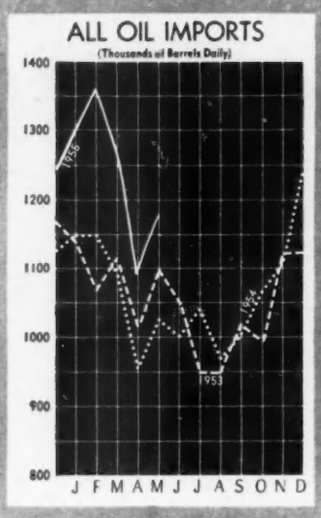
By CECIL W. SMITH, World Oil Staff

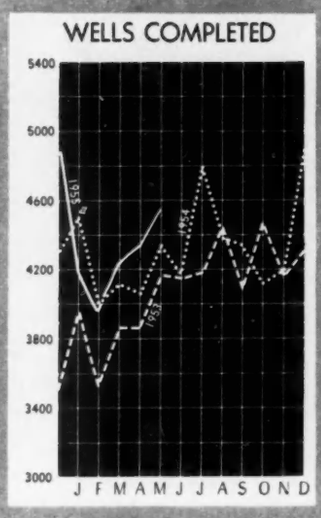
U. S. Crude Production by States

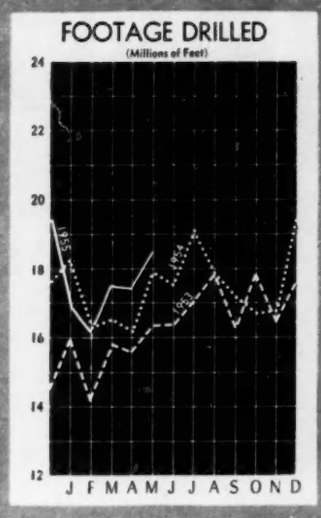
(THOUSANDS OF BARRELS)

STATE or DISTRICT	DAILY AVERAGE PRODUCTION				TOTAL PRODUCTION First Five Months		
	May, 1955	April, 1955	May, 1954	% Diff. May, '55-'54	1955	1954	% Diff. '55-'54
Alabama	3.9	4.2	4.4	— 11.4	604	679	— 11.1
Arkansas	74.4	74.3	81.3	— 8.5	11,508	12,266	— 6.2
California	973.8	974.5	984.9	— 1.1	146,511	149,715	— 2.2
Colorado	141.5	140.4	119.2	+ 18.7	19,543	15,532	+ 25.8
Florida	1.3	1.3	1.7	— 23.5	196	230	— 14.8
Illinois	222.4	217.1	180.9	+ 22.9	32,542	26,605	+ 22.3
Indiana	28.4	28.0	31.1	— 8.7	4,328	4,845	— 10.7
Kansas	312.1	329.5	329.6	— 5.3	50,359	49,399	+ 1.9
Kentucky	39.7	38.5	37.0	+ 7.3	5,875	5,574	+ 5.4
Louisiana	724.5	718.0	720.9	+ 0.5	108,093	106,593	+ 1.4
North Louisiana	114.8	114.0	117.4	— 2.2	17,624	17,512	+ 0.6
South Louisiana	609.7	604.0	603.5	+ 1.0	90,469	89,081	+ 1.6
Michigan	32.2	32.0	32.2		4,850	5,051	— 4.0
Mississippi	96.8	95.8	92.3	+ 4.9	14,386	14,108	+ 2.0
Missouri	0.2	0.2	0.3	— 33.3	28	36	— 22.2
Montana	45.8	45.2	34.7	+ 32.0	6,747	5,146	+ 31.1
Nebraska	29.6	29.3	19.0	+ 55.8	3,852	2,840	+ 35.6
Nevada	0.2	0.2	.....	.....	29	.....	.....
New Mexico	228.8	228.0	202.3	+ 13.1	33,826	30,332	+ 11.5
Southeast New Mexico	227.3	226.3	200.5	+ 13.4	33,472	30,018	+ 11.5
Northwest New Mexico	1.5	1.7	1.8	— 16.7	354	314	+ 12.7
New York	10.8	10.9	8.8	+ 22.7	1,389	1,376	+ 0.9
North Dakota	15.4	22.5	14.2	+ 8.5	3,891	2,205	+ 76.5
Ohio	11.6	12.9	11.0	+ 5.5	1,727	1,623	+ 6.4
Oklahoma	545.5	560.4	538.2	+ 1.4	83,083	82,573	+ 0.6
Pennsylvania	21.1	20.6	25.5	— 17.3	3,263	3,981	— 18.0
South Dakota	0.1	0.1	0.1	.....	16	8	+100.0
Tennessee	0.1	0.1	.....	.....	6	8	— 25.0
Texas	2,808.5	2,940.4	2,735.2	+ 2.7	445,861	412,577	+ 8.1
Dist. 1—South Central	54.1	54.5	42.1	+ 28.5	7,742	6,290	+ 23.1
Dist. 2—Middle Gulf	147.4	158.6	146.8	+ 0.4	23,552	22,309	+ 5.6
Dist. 3—Upper Gulf	449.4	467.4	441.0	+ 1.9	70,636	67,291	+ 5.0
Dist. 4—Lower Gulf-S.W	237.5	249.3	246.8	— 3.8	38,223	38,098	+ 0.3
Dist. 5—East Central	45.9	47.5	44.7	+ 2.7	7,321	6,811	+ 7.5
Dist. 6—Northeast	335.6	360.8	345.3	— 2.8	54,393	53,543	+ 1.6
Dist. 7-B—North Central	139.2	141.0	119.7	+ 16.3	21,270	19,350	+ 9.9
Dist. 7-C—West Central	189.8	199.4	183.2	+ 3.6	28,862	27,446	+ 5.2
Dist. 8—West	914.3	967.2	860.4	+ 6.3	144,651	130,472	+ 10.9
Dist. 9—North	207.6	207.4	188.9	+ 9.9	30,030	28,586	+ 5.1
Dist. 10—Panhandle	87.7	87.2	80.3	+ 9.2	13,094	12,415	+ 5.5
Utah	5.8	6.2	5.2	+ 11.5	849	798	+ 6.4
Virginia	0.1	0.1	0.1	.....	7	4	+ 75.0
West Virginia	6.6	7.2	7.3	— 9.6	1,009	1,231	— 18.0
Wyoming	283.0	283.2	253.3	+ 11.7	41,310	37,456	+ 10.3
Total United States	6,664.2	6,821.1	6,470.7	+ 3.0	1,025,688	972,791	+ 5.4









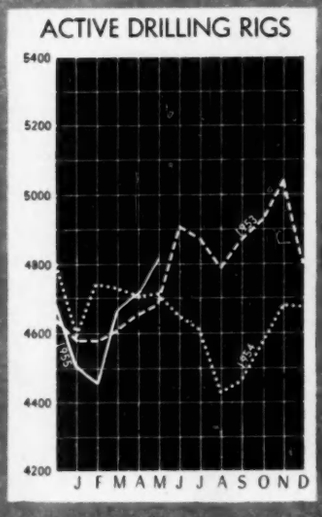
- **Crude output cut to year's low**
- **Drilling continues upward move**
- **Refining rates start build-up**

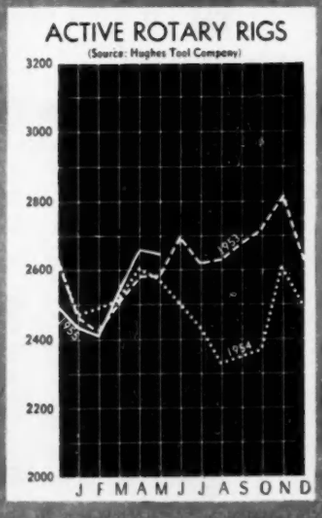
Crude Oil and Refined Products Trends

(THOUSANDS OF BARRELS)

MONTH	CRUDE OIL			GASOLINE		DISTILLATE FUEL		RESIDUAL FUEL		DAILY IMPORTS	
	Production Daily	Runs to Stills Daily	Stocks End of Month	Production Daily	Stocks End of Month	Production Daily	Stocks End of Month	Production Daily	Stocks End of Month	Crude Oil	Total Oils
1953:											
April	6,446	6,781	280,487	3,282	158,032	1,424	61,349	1,219	39,572	628	1,010
May	6,390	7,002	280,308	3,459	156,415	1,400	73,706	1,197	41,795	703	1,096
June	6,595	7,081	283,715	3,467	146,196	1,462	84,504	1,238	43,801	707	1,050
July	6,603	7,103	284,976	3,583	143,916	1,441	102,394	1,224	47,966	629	946
August	6,583	7,163	285,352	3,592	146,050	1,437	119,542	1,222	50,007	672	948
September	6,557	7,023	289,614	3,521	144,184	1,448	126,709	1,203	50,516	692	1,013
October	6,262	6,872	287,541	3,437	144,495	1,462	135,409	1,184	50,820	639	990
November	6,277	6,987	283,021	3,528	150,747	1,465	133,381	1,223	51,267	648	1,120
December	6,238	6,964	276,676	3,628	159,949	1,441	111,944	1,247	49,370	598	1,121
1954:											
January	6,240	6,947	270,811	3,431	171,704	1,550	81,044	1,271	47,474	617	1,143
February	6,379	7,068	266,918	3,476	179,950	1,545	70,390	1,241	47,119	621	1,144
March	6,507	6,923	271,867	3,375	181,297	1,458	60,270	1,168	44,249	654	1,088
April	6,615	6,811	280,310	3,404	177,006	1,374	61,721	1,140	44,362	574	950
May	6,471	7,038	282,250	3,482	177,606	1,372	73,581	1,148	47,009	708	1,021
June	6,500	6,947	285,155	3,483	165,404	1,399	86,325	1,123	50,216	624	999
July	6,242	6,916	284,894	3,480	158,010	1,416	101,657	1,089	54,365	724	1,038
August	6,168	6,862	281,043	3,492	153,168	1,453	117,579	1,069	56,332	664	966
September	6,151	6,939	274,608	3,511	150,916	1,514	128,061	1,086	56,702	672	999
October	6,135	6,834	269,442	3,457	149,661	1,545	139,128	1,066	56,541	642	1,065
November	6,346	6,975	264,566	3,530	150,604	1,622	133,886	1,120	54,891	636	1,104
December	6,394	7,238	258,385	3,605	155,400	1,668	108,144	1,187	52,105	729	1,301
1955:											
January	6,761	7,379	260,156	3,639	169,562	1,740	86,692	1,235	49,457	739	1,348
February	6,835	7,549	258,630	3,655	181,643	1,847	68,513	1,239	46,042	751	1,379
March	6,886	7,374	264,430	3,543	183,972	1,703	62,457	1,185	44,970	742	1,319
April	6,821	7,097	274,976	3,411	175,400	1,533	68,052	1,144	43,804	695	1,087
May	6,664	7,276	279,812	3,500	169,150	1,514	81,981	1,116	44,243	746	1,118
May, 1955, Change:											
In Month	−157	+179	+4,836	+89	−6,250	−19	+13,929	−28	+439	+51	+31
In Year	+193	+238	−2,438	+18	−8,456	+142	+8,400	−32	−2,766	+38	+97
Week Ended:											
6-10-55	6,600	7,522	276,692	3,712	166,233	1,679	88,414	1,137	45,194	719	1,078
6-11-54	6,495	6,820	276,185	3,276	171,370	1,399	77,495	1,208	48,530	482	799

Source: Data for last two months from API; prior monthly data from Bureau of Mines.





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U. S. WELLS COMPLETED IN MAY AND FIRST FIVE MONTHS, 1955 - 1954

STATE or DISTRICT	NEW WELLS COMPLETED AND FOOTAGE DRILLED — DETAILS FOR MAY: Oil	Dist.	Gas	Dry	Water Input	Gas Input	Water Disposal	TOTAL NEW WELLS: May, 1955	April, 1955	May, 1954	Total Footage May, 1955	DETAILS FOR JANUARY-MAY: New Wells: 1955	1954	Percent Diff.	Footage: 1955	1954	Rigs in Operation: May 31, 1955	April 30, 1955	May 31, 1954
Alabama									7	11		27	37	— 27.0	115,776	188,132	4	3	5
Arizona												4	2	+100.0	16,136	10,120			1
Arkansas	49		1	30				80	67	37	245,808	282	221	+ 27.6	921,204	792,560	39	38	31
California	163		2	55				220	240	198	1,090,519	1,008	1,084	— 7.0	4,878,065	4,899,522	245	251	225
Colorado	43		5	81				129	130	113	700,931	581	512	+ 13.5	3,138,318	2,855,427	89	85	77
Florida				2				2		2	8,532	14	13	+ 7.7	83,221	89,646	3	5	2
Georgia													3	—100.0		11,068			3
Idaho									1			2			7,305				
Illinois	143		1	110	1		1	256	306	283	636,317	1,339	1,190	+ 12.5	3,248,735	2,926,649	303	268	253
Indiana	15		2	33	1			51	41	59	79,223	219	324	— 32.4	341,263	498,232	100	98	124
Kansas	196		38	173			2	409	419	399	1,490,244	1,874	1,686	+ 11.2	6,865,020	5,882,614	498	518	409
Kentucky	42		15	60	2			119	125	127	194,327	570	562	+ 1.4	953,149	1,071,625	117	101	96
Louisiana	230	22	26	90			1	369	332	287	2,176,614	1,663	1,336	+ 24.5	10,251,750	8,451,214	390	375	295
North Louisiana	132	6	15	36				209	149	148	590,284	876	696	+ 25.9	2,471,458	2,051,624	76	87	50
South Louisiana	78	16	11	54			1	160	183	139	1,586,330	787	640	+ 23.0	7,780,292	6,399,590	314	288	245
*Gulf of Mexico	16		3	9				28	28	22	245,262	123	72	+ 70.8	1,138,951	658,262	52	50	30
Maryland																	5	2	3
Michigan	17		1	23				41	32	50	106,061	203	234	— 13.3	590,087	605,490	85	69	100
Mississippi	9	1	1	27				38	41	35	264,745	200	153	+ 30.7	1,506,012	1,061,618	42	40	36
Missouri	1			2				3	4	1	1,344	20	6	+233.3	11,063	8,133	4	3	
Montana	18			10				28	15	21	147,843	115	146	— 21.2	596,974	583,393	37	30	37
Nebraska	29			55				84	52	16	493,977	283	138	+105.1	1,634,203	762,336	49	38	23
Nevada				1				1			6,612	5	2	+150.0	36,528	12,910	1	1	3
New Mexico	92		51	30				173	141	89	701,106	646	456	+ 41.7	2,743,584	2,605,702	165	143	116
New York	17				11			28	29	45	38,662	135	278	— 51.4	186,593	387,450	49	47	78
North Dakota	17			7				24	21	15	164,621	96	97	— 1.0	702,322	683,532	19	22	32
Ohio	54		15	32				101	93	114	207,636	437	432	+ 1.2	929,279	842,577	206	203	187
Oklahoma	405	3	35	227	4		3	677	635	675	2,218,727	2,949	3,521	— 16.3	9,960,815	11,883,080	644	654	729
Oregon																	1	1	
Pennsylvania	18		16	3	13	5		55	67	96	102,746	293	486	— 39.7	550,694	841,241	110	109	213
South Dakota									2			4	10	— 60.0	24,038	43,960	2	1	4
Texas	928	40	47	540	8		1	1,564	1,447	1,535	7,041,611	7,750	7,404	+ 4.7	34,082,206	34,010,598	1,326	1,336	1,372
Dist. 1: South Central	98	2	1	54				155	137	100	419,814	724	426	+ 70.0	1,955,308	1,471,537	52	59	41
Dist. 2: Middle Gulf	31	5	7	29				72	65	59	433,208	332	352	— 5.7	2,003,371	2,091,571	38	42	53
Dist. 3: Upper Gulf	66	9	2	68			1	146	127	172	985,555	719	707	+ 1.7	4,667,369	4,824,870	127	132	146
*Gulf of Mexico		1						1	5		8,439	7			70,548		3	3	
Dist. 4: Lower Gulf-S.W.	34	14	4	53				105	108	123	564,460	557	633	— 12.0	2,906,836	3,277,035	68	69	87
*Gulf of Mexico		1						1			9,000	7			63,743		2	3	1
Dist. 5: East Central	5		1	16				22	17	21	94,530	120	100	+ 20.0	496,189	371,487	13	12	16
Dist. 6: Northeast	27	7	3	22				59	45	73	321,356	255	297	— 14.2	1,416,425	1,806,737	66	53	43
Dist. 7-B: North Central	119		1	77				197	261	182	634,880	1,240	1,122	+ 10.5	3,723,818	3,700,631	157	150	142
Dist. 7-C: West Central	68	1	1	37				107	91	104	586,368	521	535	— 2.6	2,832,497	2,718,297	134	130	143
Dist. 8: West	228	2		64	3			297	286	313	1,584,313	1,470	1,216	+ 20.9	7,979,735	7,313,859	380	383	355
Dist. 9: North	191		5	111	5			312	230	327	1,104,854	1,384	1,612	— 14.2	4,629,684	5,106,993	220	240	252
Dist. 10: Panhandle	61		22	9				92	80	61	312,273	428	404	+ 5.9	1,470,974	1,327,581	71	66	94
Utah	1			2				3	12	1	8,795	38	18	+111.1	186,416	108,447	17	16	19
Washington																			1
West Virginia	3		29	10				42	42	44	129,456	236	202	+ 16.8	637,329	570,216	184	184	159
Wyoming	31		1	34				66	47	70	305,122	292	526	— 44.5	1,453,700	2,755,588	82	72	83
Total United States	2,521	66	286	1,637	40	5	8	4,563	4,348	4,323	18,561,579	21,285	21,079	+ 1.0	86,651,785	85,446,080	4,816	4,713	4,716
Total Western Canada	78		4	30			1	113	135	122	506,249	887	781	+ 13.6	3,884,129	3,238,157	144	100	116

* Gulf of Mexico wells are included in their respective district totals.

1955 Wells Move Into Lead

Drilling rigs at 18-months' peak.

WELLS COMPLETED in May hit a new monthly high for the year and boosted the year's total into the lead in the race with 1954's drilling operations. This was the first time that last year's record-activity was topped. With the number of drilling rigs now active, this lead may well be held and even expanded to make 1955 the all-time high drilling period.

May's wells totaled 4563 to show a substantial increase over the 4348 recorded the previous month and the 4323 completed during May of last year. At the end of May, active rigs numbered 4816 for the greatest drilling effort since late months of 1953. The end-of-the-month count showed an increase of 103 rigs during May, and an even 100 over the tabulation of a year before.

Taking the lead over 1954 for the first time this year, total wells amounted to 21,285 at the end of five months. That amounted to a gain of 206 wells or one percent over the 21,079 drilled in the comparable period of 1954.

Total footage drilled took the lead a month earlier than did wells, and at the end of May held a 1.4 percent margin. May's 18.6 million feet jumped the aggregate to 86.7 million, which was 1.3 million more than was drilled a year earlier. Wells have been slightly deeper on the average than last year's. So far, each has averaged 4071 feet, while 1954's was drilled to an average depth of 4053.

Thirty wells were completed in the Gulf of Mexico during May, as activity on the Continental Shelf continues to gain momentum. Twenty-eight of those were off Louisiana's shores. In five months, wells completed there have almost lapped last year's. Current total of 137 wells being an increase of 90 percent over last year's 72. Louisiana's share amounted to 123.

Active rigs in open waters of the Gulf now total 57, an increase of 26 over those working a year ago.

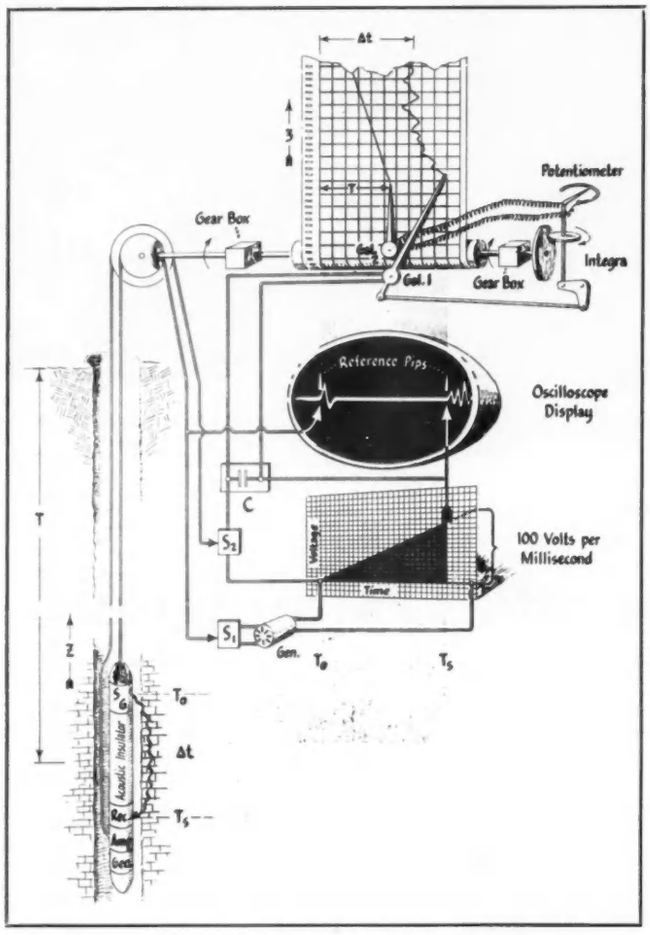

FIGURE 1—Pictorial diagram of the continuous velocity logger.

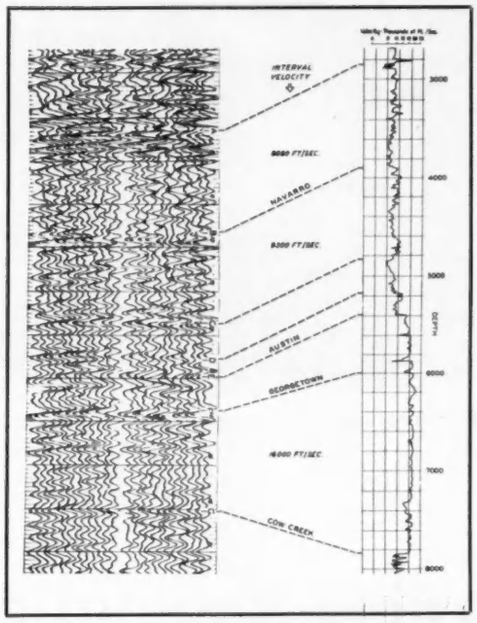

FIGURE 2—Comparison of continuous velocity log with seismic record.

New Logging Technique Speeds Seismic Surveys

Continuous velocity logger measures interval velocities over short distances while continuously developing log of formations penetrated.

A NEW LOGGING TOOL which greatly improves formation correlation and in some instances permits analytical evaluation of the formations penetrated is now available to the oil industry.

The acoustical or continuous velocity logger was developed by Magnolia Petroleum Company and is designed to measure interval velocities over short distances while continuously developing a log of the formations penetrated in the bore hole.

In addition to use for correlation and for qualitative analysis of the sediments, the continuous velocity log also offers measurements of the over-all velocity through the section logged, as determined by the integrating device which is a part of the instrument. This integrated curve shows total travel time through the section, and when used in conjunction with one or more well-geophone velocity shots, yields accurate average velocity information to the various horizons encountered. A standard well geophone is attached to and forms an integral part of the logging device run in the hole. Shales may be identified on the log by their relatively low velocity coefficients, with higher velocities indicative of sandstones, limestones and dolomites.

Theory of operation. Figure 1 is a pictorial diagram of the continuous velocity logger. It consists of an ultrasonic signal-generator (SG) which emits pulses that travel through the formation sidewalls to receive (Rec.). At the signal impulse instant, switch (S_1) closes starting saw-tooth generator (Gen) which develops a voltage proportional to time.

When the sonic signal arrives at Rec, switch (S_2) is closed discharging the generator voltage, as of that instant, into condenser (C). This voltage is impressed on galvanometer (Gal. 1) whose pointer traces the value of $\triangle$ T on the log at the indicated depth.

The time-instant of the signal and its arrival-time at Rec are displaced on an oscilloscope.

The integrator adds up the $\triangle$ T's to provide the over-all travel-time (T) for the interval logged.

Figure 2 is a comparison of continuous velocity log and seismic record. The close relationship between reflections and breaks in the velocity log is noticeable, although the most prominent changes in velocity are not necessarily represented by the most outstanding reflections. It should be noted that reflections are associated with both increase in velocity as at "B," and decrease, as at "C" or "G." The limestone section below "E" shows very high interval velocities, and the corresponding shortening of time interval on the seismic record is well illustrated by the convergence of the correlations below that marker.

ACKNOWLEDGMENT

Information contained in this article was furnished by Seismograph Service Corporation, Tulsa.

—The End

Wild buckwheat growing on cinders in Craters of the Moon National Monument, Idaho. Buckwheat and bunches of grass are the first plants to grow on cinders.

Growing Vegetation Identifies Formations

Field geologist can be aided by recognizing the relationship between plants and the formations on which they grow.

By Dr. A. N. MURRAY, The University of Tulsa, Tulsa, Okla.

THE GROWTH of a certain plant or group of plants on a rock formation is a biogeological relationship that has been used widely in geologic mapping where formations have been covered or outcrops are poor and distinguished characteristics are lacking. The reasons for this relationship have been given little attention, but the accumulating data on trace elements and the part they play in plant growth have focused attention on the problem of the preference of certain plants for different geological formations.

The recent work in biochemistry directed toward the location of ore deposits by the anomalous accumulation of trace elements in plants has attracted the attention of mining companies, which are now extending their cooperation and support to investigations on the possibility of using biochemistry in prospecting for copper, zinc, and other metals. The results recently obtained on this problem are encouraging.

The identification and mapping of formations by the kinds of plants growing in the joints and cracks of the rock of the formation, as well as in the overlying soil, has been used by field geologists for many years. This article will describe no new techniques, but, as a matter of general interest, will summarize the factors that bring about this biogeological relationship and the new biogeochemical data that have been obtained by recent investigations. A bibliography is presented for those who might be interested in a further study of the subject.

Junipers and pinion growing on Entrada sandstone in Dinosaur National Monument, Colorado. Note their absence on Morrison formation which forms ridge in middle of photograph.

Principal factors. The two factors that are most important in determining plant growths are climate and soil. The climate of an area is, of course, determined by the temperature and the amount of precipitation or moisture. Both of these factors influence the kinds of plants that will grow in a locality, but of these plants that will

grow under a given climate only the character of the formation and the soils derived from it may bring about greater selectivity.

The character of the soil or the formation from which it was derived is, then, the factor that brings about the biogeological relationship between the flora and the geological formation. The soil's chemical composition controls to a large extent the vegetation that will grow in it, but its physical characteristics are often very important.

Junipers and pinion on Mesa Verde sandstone south of Rangely oil field, Rio Blanco County, Colorado. Openings between the junipers are underlain by shale and overlain by alluvium. Sage and grasses grow in the alluvium.

Climatic factor. The climate controls to a large extent the growth of vegetation. Temperature may be a factor in the determination of the genus and species of plants that an area will support. According to Daubenmire[4] it is one of the chief factors in the zonation of vegetation in the Rocky Mountains, but there are many other contributing conditions.

Moisture, like temperature, may control the kind of plants present in a locality as well as the rate of growth and the size attained. The amount of precipitation influences the chemical character of the soil by greatly aiding in the decomposition of the silicate minerals and by the removal of soluble materials.

Soil factor. Soils are produced from the disintegration and decomposition of rocks. They are the important factors in the biogeological relationship existing between plants and geological formations. The physical character of the soils differs markedly because of the differences in the parent rocks. Sandy soil and clay soil produce variation in vegetation.

Evidently the most important factor in determining the growth of a plant is the chemical characteristics of the soil or formation in which it grows. The acidity, the amount of plant nutrients, and the occurrence of trace elements or micro-nutrients give the soil chemical character. With all of the possible combinations of different elements a great variety of soils results. Some soils, because of the presence of certain elements, will support certain plants. Without these elements plants will develop deficiency diseases.

The six major or primary plant nutrients of the soil are nitrogen, potassium, phosphorus, sulfur, calcium, and magnesium. These elements, with the exception of nitrogen, are all obtained from rocks and made available to plants by weathering. The presence of only small amounts of any one of these elements may prevent the normal development of plants, while a sufficiency will promote luxuriant growth.

The elements used by plants in very small amounts in their life processes are designated as trace elements or micro-nutrients. Of these micro-nutrients, iron, manganese, aluminum, and silicon are available in the soil far in excess of the plants' needs. The remaining micro-nutrients, of which zinc, boron, copper, and molybdenum are examples, are found sparingly in most soils.

Variation of concentration of trace elements in plants. Trace elements seem to be concentrated in plants to a greater extent than in the soils in which they are growing under normal conditions. It is also known that the different kinds of plants growing in the same soil will select and absorb different elements and in different amounts.

Formation of soils. Soils that result from the disintegration and decomposition of a particular rock or formation are similar to the parent rock in chemical character as long as they are not extensively leached and remain in place. Extensive leaching and weathering may largely remove the soluble compounds that give the soil individuality and leave an insoluble residue of silica, hydrated aluminum silicates, and oxides.

Igneous, metamorphic, and sedimentary rocks as groups do not yield characteristic soils, but the different rocks in a group may yield soils that have marked physical and chemical differences. Soils from igneous and metamorphic rocks usually have fewer marked differences than those from sedimentary rocks.

In igneous rocks it seems that there is a more uniform distribution of elements essential to plant life. This would be particularly true in the acid and intermediate rocks, the soils from which are known to be fertile. The basic and ultra-basic rocks are less balanced in nutrients and micro-nutrients. It is reported by Warren[27] that ultrabasic rocks usually provide meager support for vegetation.

Metamorphic rocks which may have had their origin from either sedimentary or igneous rocks yield numerous kinds of soils. If the country rock is metaigneous, the soil will be similar to those of igneous rocks. Metasedimentary rocks, however, will probably not yield as great a variety of soils as true sediments, but those that they do produce will be similar to those from sedimentary rocks.

Sedimentary rocks on weathering yield soils that have a greater variety of chemical characteristics than those formed from any other group of rocks. This great variety of sediments is brought about by the numerous sources from which sedimentary material comes, the several means by which this material may be transported, and the various environments under which it may be deposited.

Sandstone on weathering yields a sandy soil that is porous and absorbs water readily. The important plant foods and micro-nutrients that the

soil may contain will depend upon the chemical character of the original sandstone. Some pines and oaks grow best on sandstones and in sandy soils. This preference may be for the physical conditions existing in the sandy soil instead of the chemical character because the preference is not for a particular sandstone but for sandstone.

The shales and the clay soils produced from them by weathering do not allow free movement of water and are often impervious. The clay soils hold water well, but replenishment is very slow and often deep penetration is not accomplished except in areas of abundant rainfall. Shales are known to contain a great variety of mineral material including the micro-nutrients. One shale will probably not contain all of the elements that are known to occur in shale, but it may carry one that is found only in few sediments. From field observations it is believed that both the chemical character and the physical properties control the plants that may be supported by shale formations and the corresponding soils produced from them by weathering.

The limestones, according to Warren,[27] tend to produce special flora. Certain grasses in Osage County, Oklahoma, are so restricted to limestone soils that unexposed limestone formations may be mapped by the grass that grows above them. It is interesting to note that Daubenmire[4] credits Korstian with showing that conifers do not favor soils containing lime. Teasel *(Dipsacus)* which is known to perfer limestones or limestone soils is said by Fitts[6] to be found particularly on cherty limestones. Warren's statement[27] that special flora are produced by limestone has been verified by Fitts[6] in the Arbuckle Mountains, Oklahoma, where the different limestones can be differentiated by the plants that grow upon them.

Climate and soils. Soils produced from the same parent material under different climates will differ considerably. Low temperatures retard chemical reaction and lack of moisture prevents chemical reaction and the removal of soluble salts. The opposite is true of high temperatures and plenty of moisture. In polar climates decomposition takes place very slowly, even in the presence of plenty of water; only removal by leaching of the soluble salts originally contained in the rocks will occur.

In the areas of abundant rainfall under temperate and tropical climate there will be a tendency for the soils to weather and to be leached of considerable amounts of the soluble salts originally contained in the rocks as well as those produced in the weathering process. This leaching tends to make soils of different parent materials similar at maturity. Jenny[9] presents data to show that the ratio of bases, potassium, sodium, and calcium, to aluminum, which is widely different in acid and basic rocks, becomes smaller on weathering and very near the same value in the mature soils formed from these rocks. He also shows that the mature soils from these same rocks have silica-alumina ratios that are lower and closer together than in the parent materials.

About the Author

DR. ALBERT NELSON MURRAY has been head of the Department of Geology at the University of Tulsa since 1928. He works as a consulting geologist during the summer months. He obtained his B.A. degree from the University of Colorado in 1922, an M.S. there in 1924, and Ph. D. at the University of Illinois in 1928. He has been an instructor at the University of Colorado and junior geologist for the Colorado Geological Survey, 1923-1925, and instructor at the University of Illinois, 1925-1927. He is a member of AAPG and several other scientific societies.

The arid and semi-arid climates, where the temperature is from moderate to high, promote chemical action but not excessive leaching. It is under these climatic conditions that the close relationships between vegetation and formations are found. This is because the elements or compounds of the elements necessary to plant growth have not been removed to any extent.

Soils under an arid to semi-arid climate will tend to be alkaline to neutral, while under a humid climate they will tend to be neutral to acid, because of the extensive leaching action.

In conclusion it may be said that this tie between biology and geology through trace elements or micronutrients taken from the rocks by the plants is an additional and little developed tool in the hands of the field geologist and the prospector. It appears that better understanding of the relationships between plants and formations through research will give to biogeochemistry an important place in geological investigations of either a purely scientific or economic nature.

BIBLIOGRAPHY

[1] Beath, O. A., Gilbert, C. S., Epperson, H. F., "Selenium in Soils and Vegetation Associated with Rocks of Permian and Triassic Age," Amer. Jour. Bot., Vol. 24 (1937), pp. 96-101.

[2] "The Use of Indicator Plants in Location of Seleniferous Areas in Western United States," Amer. Jour. Bot., Vol. 26 (1939), pp. 257-269, 296-315.

[3] Byers, H. G., "Selenium Occurrences in Certain Soils in the United States with a Discussion of Related Topics," Dept. of Agriculture Tech. Bulls. 482 (1935), 530 (1936), 601 (1938).

[4] Daubenmire, R. F., "Vegetational Zonation in the Rocky Mountains," Botanical Review, Vol. 9 (1943), pp. 325-393.

[5] Delavault, R. E., and Irish, R. I., "Emploi de la Dithizone en Solution Ammoniacle," Compte Rendus des Seances de l'Acadamie des Sciences, Tome 229, No. 21 (1949), p. 1079.

[6] Fitts, L. E., Personal Communication.

[7] Hawkes, H. F., "Geochemical Prospecting for Ores," Econ. Geol., Vol. 44 (1949), pp. 706-712.

[8] Huff, L. C., "A Sensitive Field Test for Heavy Metals in Water," Econ. Geol., Vol. 43 (1948), pp. 675-684.

[9] Jenny, Hans, "Factors of Soil Formation," McGraw-Hill, New York, 1941.

[10] Larkin, H. W., Stevens, R. E., Almond, Hy, "Field Methods for the Determination of Zinc in Soils," Econ. Geol., Vol. 44 (1949), pp. 296-306.

[11] Leyton, L., "Mineral Nutrient Relationships of Forest Trees," Forest Abstracts, Vol. 9, pp. 399-408.

[12] Meyer and Anderson, "Plant Physiology," Van Nostrand, New York (1946), p. 404.

[13] Reichen, L. E., and Lakin, H. W., "Field Methods for Determination of Zinc in Plants," U. S. Geol. Survey Circular 41 (1949).

[14] Robinson, W. O., Lakin, H. W., and Reichen, L. A., "The Zinc Contents of Plants of the Friedemsville Zinc Slime Ponds in Relation to Biogeochemical Prospecting," Econ. Geol., Vol. 42 (1947), pp. 572-582.

[15] Sokoloff, V. P., "Geochemical Prospecting for Ores," Mines Mag., Vol. 38 (1948), pp. 21-24.

[16] Stiles, W., "Trace Elements in Plants and Animals," Cambridge Univ. Press, New York (1946).

[17] Sylvestre, Frere C. S. C., "De la Distribution du Cuivre dans les Principaux Arbres du Quebec," Ecole des Hautes Etudes Commerciales de Montreal, Contrib. No. 18.

[18] Trask, P. D., "Applied Sedimentation," Wiley and Sons (1950), pp. 537-555.

[19] Vallee, B. L., "Function of Trace Elements in Biology," Sci. Month., Vol. 72 (1951), pp. 368-376.

[20] Warren, H. V., and Howatson, C. H., "Biogeochemical Prospecting for Copper and Zinc," Geol. Soc. Amer. Bull., Vol. 58 (1947), pp. 803-820.

[21] Warren, H. V., and Delavault, R. E., "Biochemical Investigations in British Columbia," Geophysics, Vol. 13 (1948), No. 4, pp. 609-624.

[22] Warren, H. V., Delavault, R. E., and Irish, R. I., "Biogeochemical Research on Copper in British Columbia," Royal Soc. Canada Trans., Vol. 43 (1949), pp. 119-137.

[23] Warren, H. V., and Delavault, R. E., "Further Studies in Biogeochemistry," Geol. Soc. America, Vol. 60 (1949), pp. 531-560; Can. Inst. Min. and Met. Trans., Vol. 53 (1950), pp. 243-246.

[24] Warren, H. V., and Delavault, R. E., "Gold and Silver Content of Some Trees and Horsetails in British Columbia," Geol. Soc. America Bull., Vol. 61 (1950), pp. 123-128.

[25] Warren, H. V., and Delavault, R. E., "A History of Biogeochemical Investigations in British Columbia," Can. Min. and Met. Bull., Vol. 43 (1950), pp. 344-350.

[26] Warren, H. V., Delavault, R. E., and Irish, R. I., "Biogeochemical Investigations in Pacific Northwest," Geol. Soc. America Bull., Vol. 63 (1952), pp. 435-484.

[27] Warren, H. V., and Delavault, R. E., "Trace Elements in Geochemistry and Biochemistry," Sci. Monthly, Vol. 75 (1952), pp. 26-30.

[28] White, W. H., "Plant Anomalies Related to Some British Columbia Ore Deposits," Can. Min. and Met. Bull. No. 459 (1950), pp. 368-371.

—The End

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Falcon-Seaboard Drilling Company's rig on location at Gulf's Clara Pyle 1, which opened the first Mississippian lime oil production in Kiowa County, Kansas.

Major Field Promised In Western Kansas

Two wells 12 miles apart produce from same formation at approximately same depth. Development of production between them would establish an important field.

By **ANTHONY GIBBON,** World Oil Staff

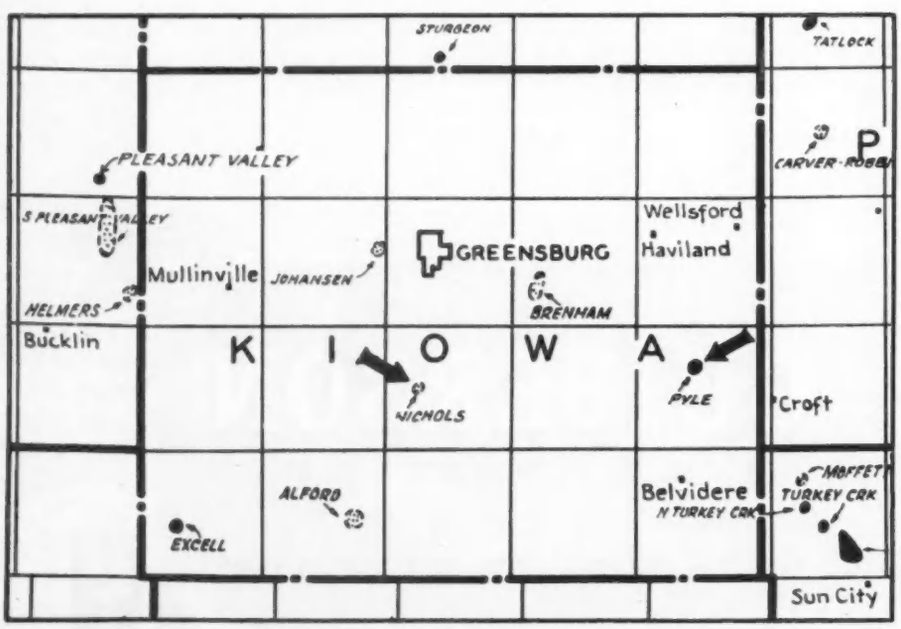
One of the most important recent oil and gas developments in western Kansas is the discovery of the first Mississippian lime oil production in Kiowa County. A relatively large undeveloped area in the vicinity of Greensburg now appears destined for a major play, which might well develop into one of the larger fields in the Mid-Continent area. The new strike is attracting attention of producers and drilling contractors. The pay is relatively shallow, and drilling presents few problems. Fairly good secondary roads make moving of equipment economical, with supply centers at Russell and Great Bend, Kansas.

Credit for the discovery is shared jointly by Falcon-Seaboard Drilling Company of Tulsa, which originally assembled the block of some 40,000 acres, and Gulf Oil Corporation, which made a deal with Falcon-Seaboard and drilled the discovery well. Lacking adequate subsurface control at the present, no definite geological determination has been made as to the type reservoir, but it is generally felt that the accumulation is in a stratigraphic trap located southwest of the Central Kansas Uplift and in the Dodge City Basin area. which lies adjacent to and north of the Anadarko Basin.

Two wells 12 miles apart—one an oil well and the other a gas well, both producing from the Mississippian lime at approximately the same general depth—adds to the significance of the strike. If production is developed between these two wells a field of major proportions is undoubtedly in the making.

After assembling the big block, Falcon-Seaboard made a deal with

Continued on Page 114

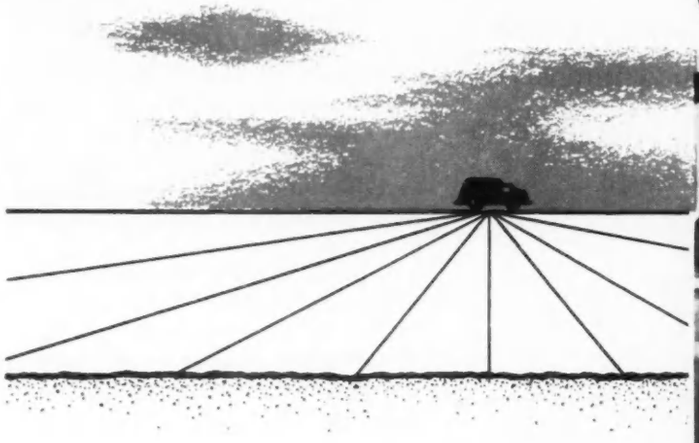


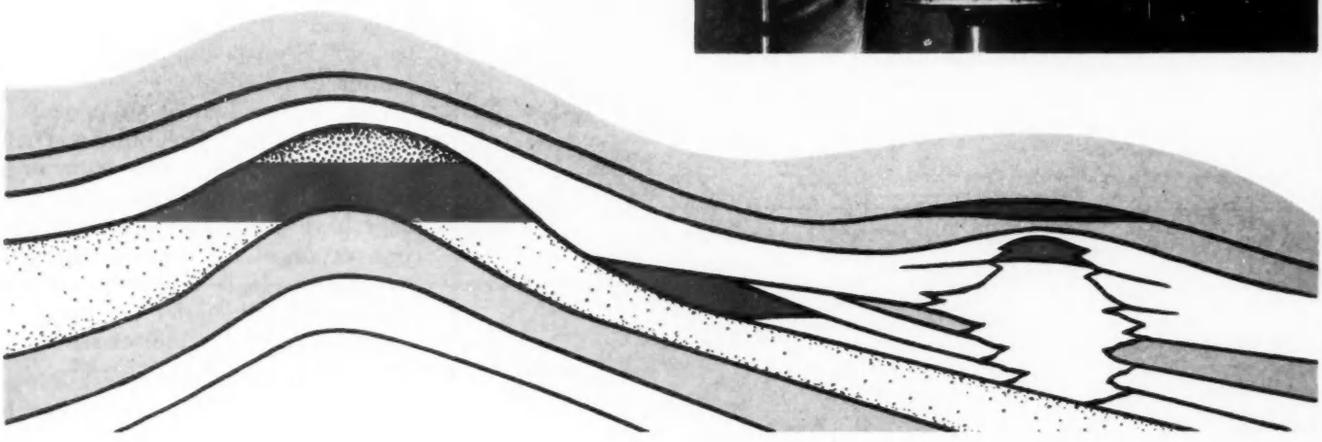
General location of Gulf-Falcon-Seaboard's discovery in Kiowa County, Kansas. The Pyle well is the first commercial oil found in Mississippian lime in Kiowa County. Nichols gas well is 12 miles from Pyle discovery indicating a possible major reservoir in a large stratigraphic trap between the two wells.

Map by E. C. Jacobson, Tulsa

No. 3 of a Series

RECONNAISSANCE BY GRAVITY





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A New Look at the Central Ardmore Basin

This area will assume a new attractiveness if its structure and geologic history are studied intensively. This is indicated by information obtained through an investigation of township in the heart of the basin.

By RICHARD F. SHAW, JR., Geologist,
The Carter Oil Company, Shawnee, Okla.

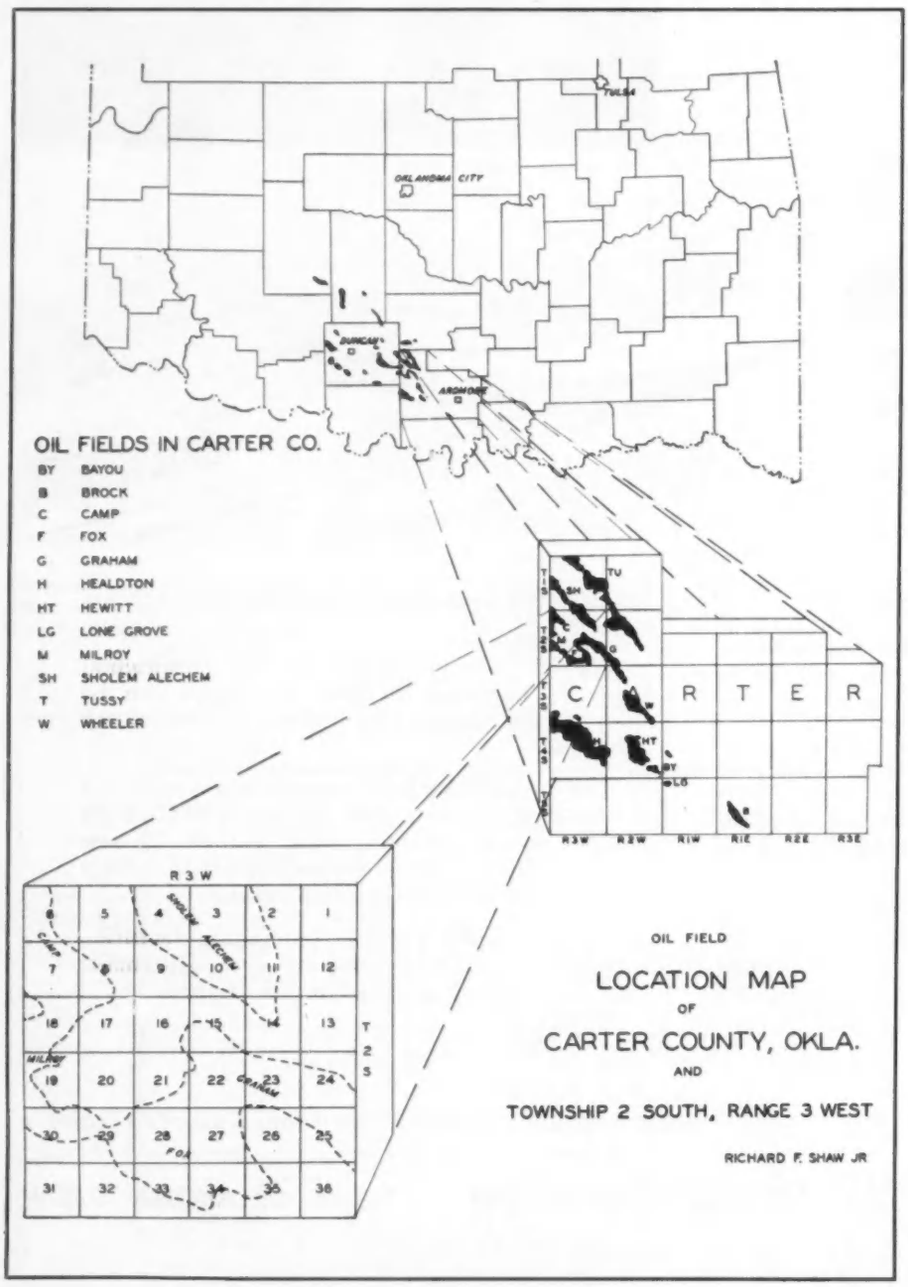

FIGURE 1

In the past various ideas have been advanced concerning the subsurface geological features in the Ardmore Basin. Because of the extremely complicated nature of the geology, and due to the lack of adequate well control, many of these interpretations were incomplete and some were false. As a consequence, potential oil fields have been overlooked.

A detailed study of one township, situated in the heart of the basin and containing abundant wells, was made in the belief that it would provide solutions to some of the problems found in this region. Township 2 South, Range 3 West was selected. It lies on, or very near, the axis of the basin, and partially or wholly contains five prolific oil fields (see Figure 1—location map).

The purpose here is to present a summary of the conclusions reached as a result of this study. Numerous subsurface structural and thickness maps have been incorporated in the construction of the three-dimensional illustrations. It is hoped that these illustrations will clarify the complex geological history of the township.

Development records reveal that in 1912 the Gypsy Oil Company, through intensive surface work, found a structure near the town of Fox, Okla. On Christmas Day, 1915, Gypsy completed a well on this structure for a daily production of 22 million cubic feet of gas at a depth of 2018 feet. This was the first successful test in 2 s 3 w, and was the discovery well for the Fox Field.

During the following eight years, Graham, Milroy, and Sholem Alechem fields were also discovered by surface methods. This seems to be the first phase in the oil and gas development of the area. During this phase, study of the surface outcrops was the principal means of exploration. Only the shallower producing zones along the crests of the major structures were exploited.

In 1926 so few wells had completely penetrated the rocks of Pennsylvanian age, that a description of the Pennsylvanian System in the area was impossible. The possibility for deeper production in the township aroused a considerable amount of interest. On

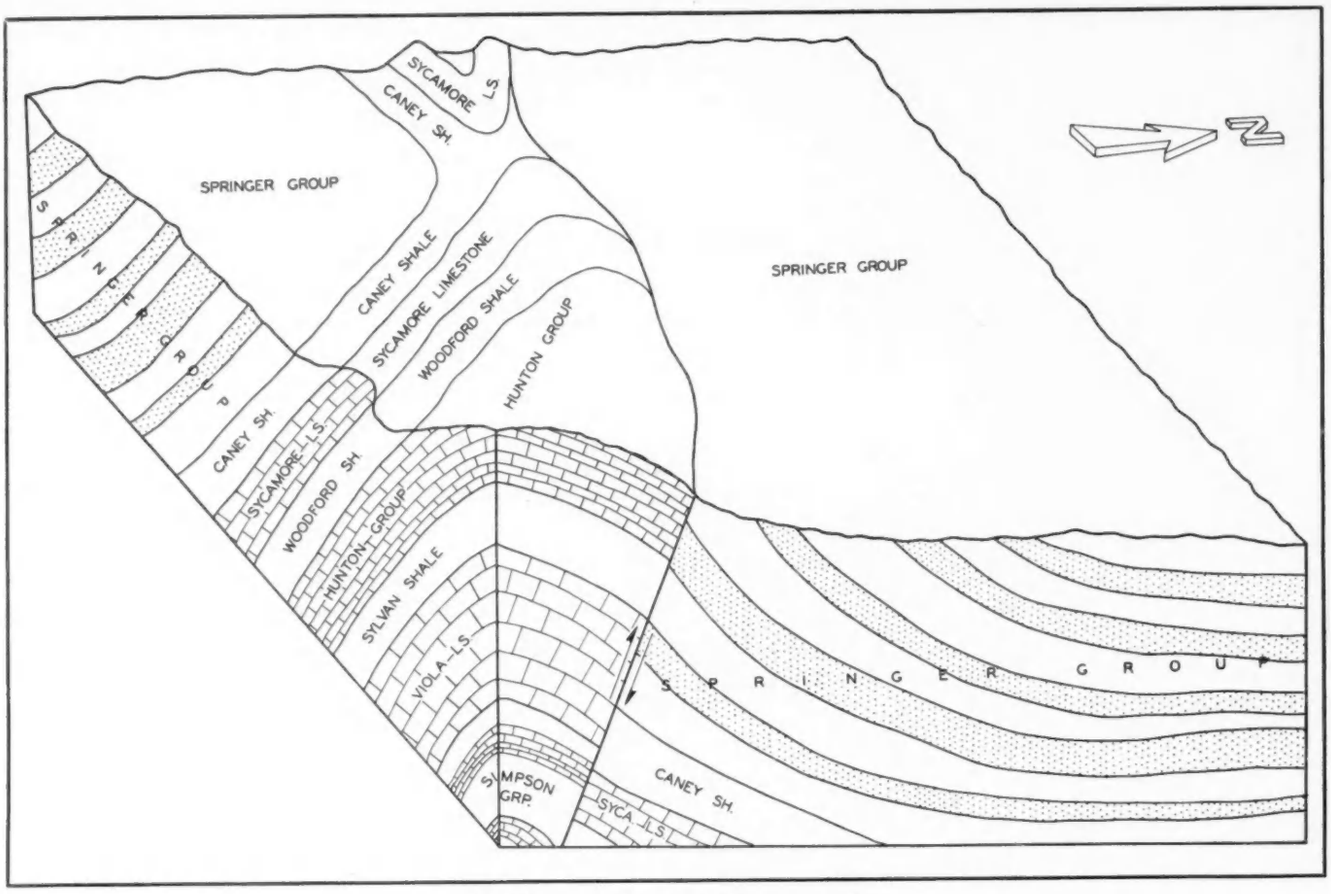

FIGURE 2—Area during post-Morrowan erosion.

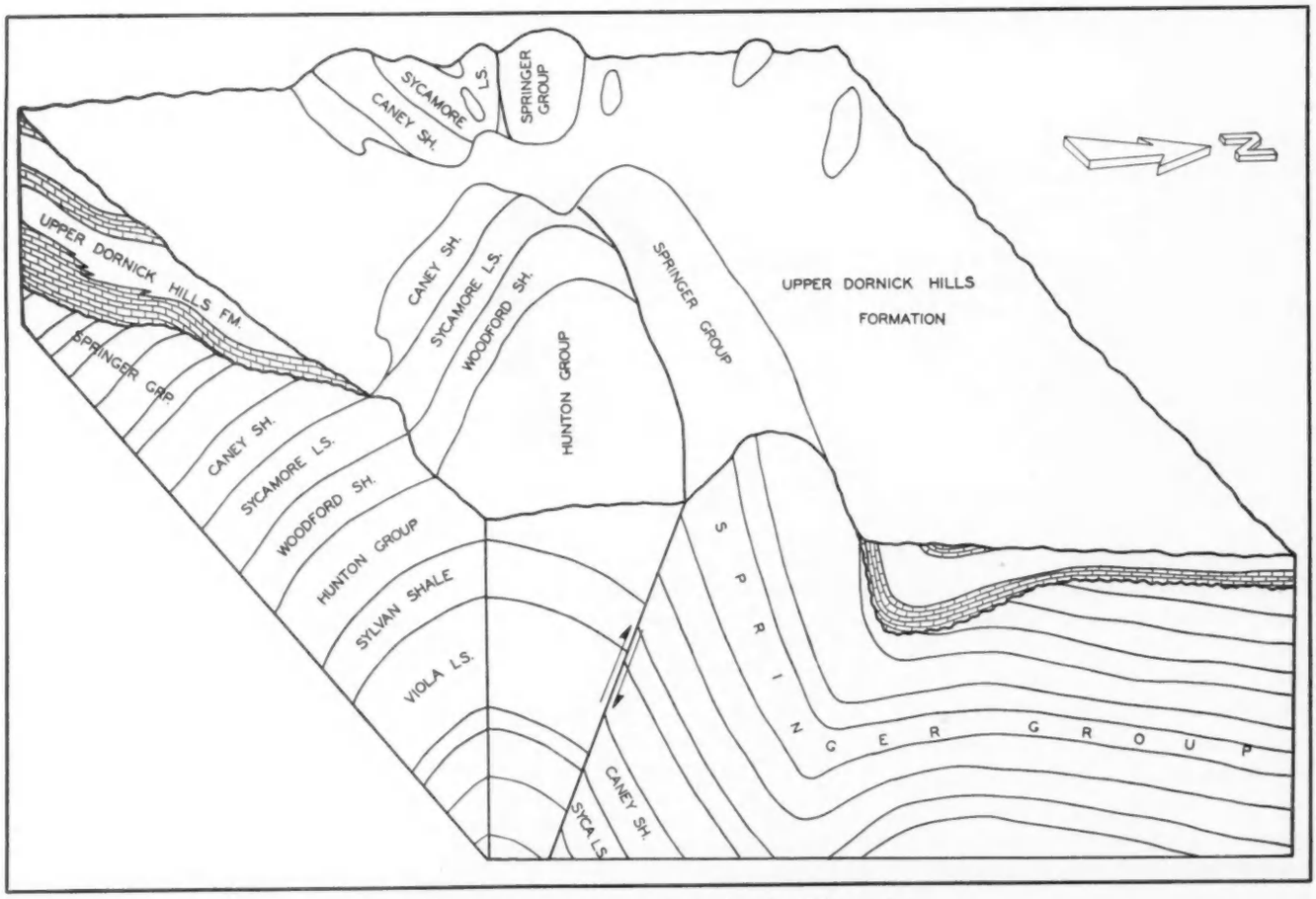

FIGURE 3—Area during post-Upper Dornick Hills erosion.

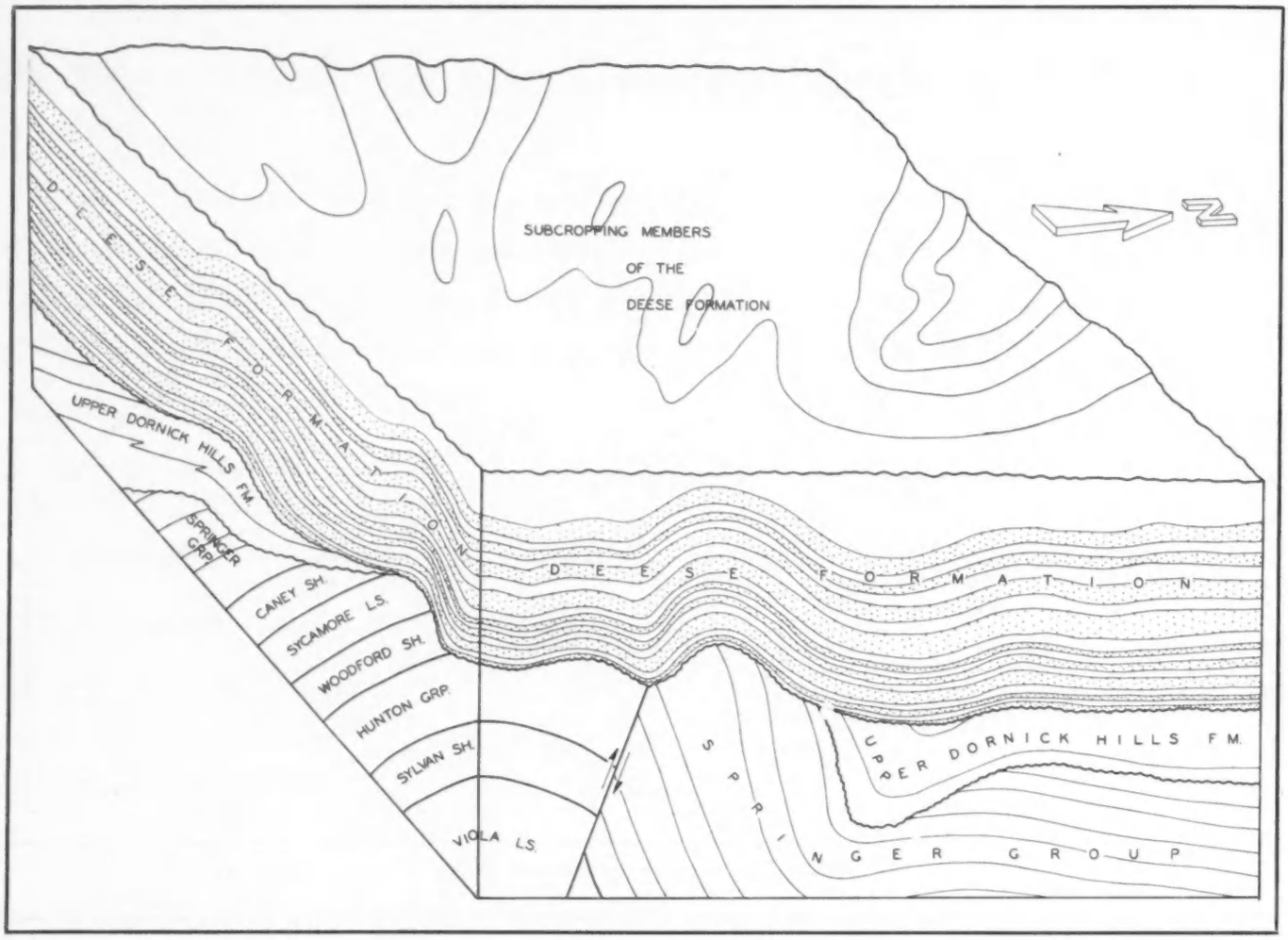

FIGURE 4—Area during post-Deese erosion.

September 12, 1937, after detailed seismic and subsurface investigations, The Carter Oil Company completed a well in the Milroy sector for 2640 barrels of oil per day from perforations in an oolitic section of the Simpson Group at 7555 feet. The second phase of development of oil and gas production in the township had then begun. It also was limited chiefly to the crests of the most intensely folded anticlines.

Development along the crests of the major structures continued until 1947. On August 26 of that year Stanolind Oil and Gas Company completed a well producing from a Springer sandstone on a flank of the Sholem Alechem structure. This touched off exploration for oil accumulations in the eroded, up-dip edges of the thick and porous Springer sandstone beds along the edges of the known structures in the area. This, the third phase of development, is currently in progress. It has not only uncovered great reserves in the eroded edges of producing beds along the flanks of the major structures, but has led to the discovery of smaller associated anticlines such as those in the Camp sector.

The geologic structure found in the Ardmore Basin is notoriously complex. The basin itself, and the structures in the basin, were not formed by gentle, vertical movements in the granite basement. On the contrary, they were formed by violent, mountain-making compressions which occurred at several different times during the Pennsylvanian period of deposition.

The Ardmore Basin is actually the southeastern end of the deep, narrow northwest-southeast trending Anadarko Basin. It lies between the Amarillo-Wichita-Criner Hills uplift on the south, and the Hunton-Tishomingo uplift on the north and east. It is thought that near the Arbuckle mountains the Ardmore basin is more

About the Author

RICHARD F. SHAW, Jr., was born in Oklahoma City and was graduated from the University of Oklahoma in 1950 with a B.S. degree in geology. He was employed by Phillips Petroleum Company at Bartlesville as a geological technical trainee for about a year and then joined the U. S. Army serving as a first lieutenant during the Korean conflict. He joined The Carter Oil Company as a junior geologist in 1954 and the same year received his M.S. degree from the University of Oklahoma.

than 35,000 feet deep, and it has been squeezed so much that its width has been shortened about fifteen miles. Because of this tremendous thickness of sedimentary rock and the gigantic compressive forces which were exerted upon it, folds and faults of great magnitude occur in the region.

The compressive forces exerted, during the Pennsylvanian Period, by these marginal masses were so great that seven major anticlinal folds were produced in 2 s, 3 w. These large anticlines and their subsidiary folds provide the traps for the five oil fields existing in the township.

Many past studies of portions of the Ardmore Basin have been criss-crossed with faults. In attempting to explain abrupt changes in the elevation of a mapping horizon or the apparent disappearance of a sandstone, faults were frequently inserted. With the dense well control now available it can be seen that many of these faults are nonexistent. Therefore, they should be omitted in order to gain a more accurate structural interpretation of the area. In the subsurface work performed in 2 s, 3 w the only fault evidence accepted was in the case of one or more wells penetrating the fault plane.

This outlook concerning faulting was assumed not only because it would eliminate all apparent faulting, but also because of the existence of a structural condition which is especially prevalent in southern Oklahoma. This condition is brought about by the ability of each thin bed of shale to slip on the bed of shale beneath it. According to the theory, if a thick shale section is exposed to intense squeezing, the beds would be caused to flow rather than break. If this idea is correct, the probability of the occurrence of major faulting in the thick, elastic Pennsylvanian beds is slight.

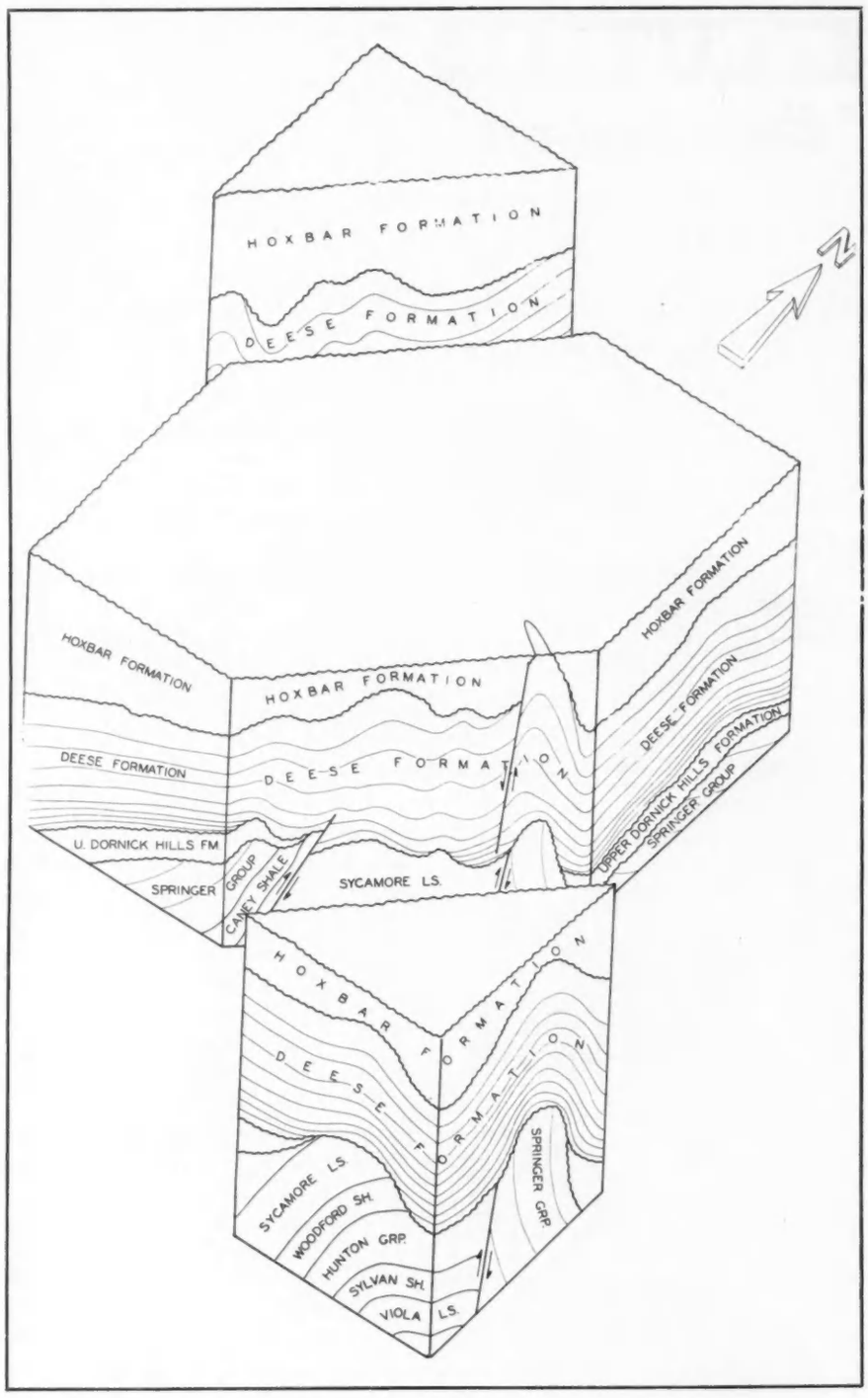

FIGURE 5—Area during post-Hoxbar erosion.

The geologic evolution of the Ardmore Basin is one of the cataclysmic turmoil during the Pennsylvanian Period of deposition. This portion of the earth suffered intervals of tremendous compression as the Amarillo-Wichita-Criner Hills chain was thrust northward. Each time the area received such a shock the rock layers bent and folded, causing the sea to retreat. Then, as the compressive force was relaxed, the area was slowly submerged by the sea once more.

There is no evidence that any significant mountain-making movements occurred in this region from the beginning of sedimentary deposition until the Pennsylvanian period of deposition. During most of this time the sea was quietly depositing sediments in a slowly subsiding trough.

After the Springer shales and sandstones were deposited, a tremendous thrust from the south occurred. It pushed up the Amarillo-Wichita-Criner Hills chain. As this chain was pushed northward, it caused the rock layers ahead of it to bend downward. Thus, the ancestral Anadarko Basin began its development. In 2 s, 3 w, this northward thrust broke the layers of rock and caused them to ride over the younger rocks ahead of them. Consequently, the area was uplifted, causing the sea to retreat; thereby ex-

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posing the rocks to erosion (see Figure 2).

After this period of erosion, 2 s, 3 w was once more downwarped, allowing the sea to re-enter. The limestones and shales of Upper Dornick Hills age were deposited as it engulfed the eroded surface. After deposition of this rock sequence, another, smaller tremor was felt in the area. As a result of this second thrust, the rock strata on the north and south flanks of the previously uplifted areas were folded upward, and the township was subjected to erosion again (see Figure 3).

As the surface settled back down the Deese sea slowly encroached, progressively depositing sand and shale beds. During deposition of the Deese formation, there is evidence that minor, insignificant movements shook the region. Uplift at the close of Deese lime resulted in the initial folding of the Sholem Alechem structure and rejuvenation of the prior folding in the Milroy, Fox, and Graham regions. Only a small degree of erosion was experienced after the post-Deese emergence (see Figure 4).

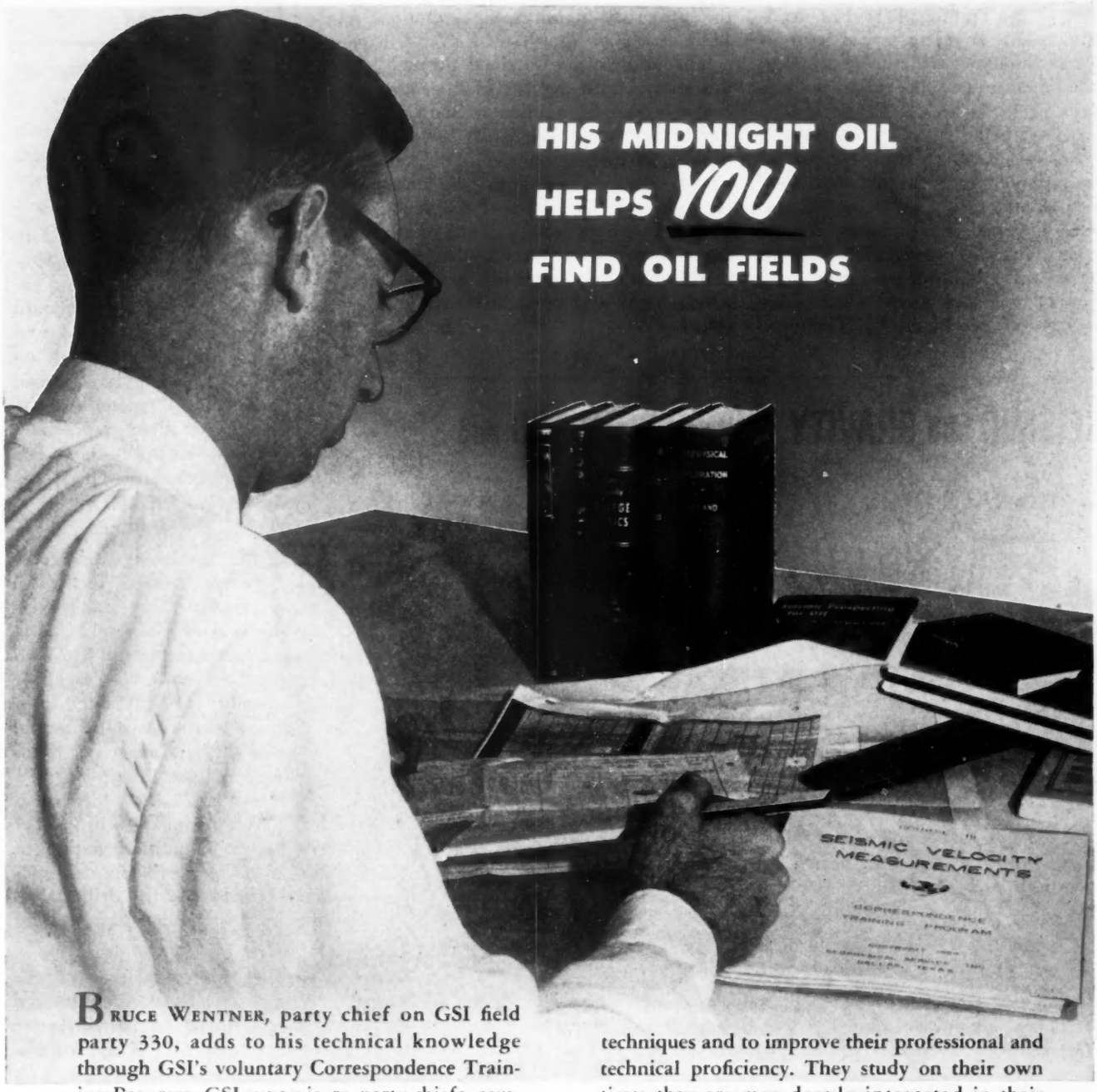
The Hoxbar sea then very rapidly submerged the area and deposited lenticular sandstone, limestone and shale beds. After Hoxbar deposition, the region suffered its greatest phase of dynamic rearrangement. A final, vicious thrust from the south pushed the Amarillo-Wichita-Criner Hills chain even further northward, causing sharp rejuvenation of the existing structures (see Figure 5), and uplift of the Arbuckle Mountains. During the following period of exposure the surface was rapidly cut away and redeposited as gravel and cobbles in the Pontotoc formation. The ensuing quiescence was broken only by the gentle folding which occurred at the

Geologic Column

SYSTEM	FORMATION	MEMBERS
Permian	Wichita—Clearfork	
	Pontotoc Cisco (missing in T.2.S.,R.3.W.)	
	Hoxbar	
Pennsylvanian	Deese	*Culberson ss.
		*Upper Fusulinid ss. zone
		*Fusulinid ss. zone
		*Tussy ss. zone
		*First Carpenter ss.
		*Second Carpenter ss.
		*Morris ss.
		Lower Morris ss. zone
		Brooks ss. zone
	Upper Dornick Hills	
	Lower Dornick Hills (possibly missing	in T.2.S.,R.3.W.)
	Springer	Markham ss.
		*Aldridge ss.
		*Humphrey ss.
		*Sims ss.
		*Goodwin ss.
Mississippian	Caney Shale	
	*Sycamore limestone	
	Woodford shale	
Devonian	Hunton Group	
Silurian		
	Sylvan shale	
	Viola limestone	
	*Simpson Group	
	Arbuckle limestone	

* Indicates production in this area.

FIGURE 6—Known producing horizons in formations which have been tested.



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close of the Permian Period of deposition. This folding served to rejuvenate the major structures enough to allow them to be reflected on the surface.

Although the petroleum reserves in 2 s, 3 w have been exploited for 39 years, only 6 percent of the wells have been abandoned, and none of the fields have been completely defined either laterally or vertically. There are at least 13 known producing horizons in the formations which have been tested (see Figure 6). Therefore the future possibilities of the Ardmore Basin are almost limitless.

The information obtained through this study of the geology of 2 s, 3 w probably can be applied to most of the basin. Work previously accomplished in the region should be reviewed in this new light. Furthermore, if intensive studies of the structure and geologic history of the entire basin were accomplished, the Ardmore Basin would assume a new look which could lead to undiscovered reserves of oil. —**The End**

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Major Field Promised

Continued from Page 106

Gulf Oil Corporation assigning part of its acreage in checkerboard spreads and then took the contract to drill the first well.

The well was the Clara Pyle 1 in the NE NE NE of Sec. 16-29s-16w. Using its Rig No. 26 which has a capacity of 6500 feet, Falcon-Seaboard spudded in on December 4, 1954, and completed the discovery oil well on Christmas day. The rig is equipped with a hydrodrive "twister" drawworks, two twin-six diesel engines and 7¼ x 14 pump, with 126-foot mast and five-foot substructure. This is one of Falcon-Seaboard's lighter rigs.

The well was bottomed at 4270 feet, and the producing zone perforated between 4666-80 feet. The well was completed for 304 barrels per day natural of clean oil. Casing program included 469 feet of 8⅝-inch surface pipe set with 300 sacks of regular cement. The 5½-inch producing string was set to total depth. Drilling was easy and no major problems were encountered. Crews used 1 12¼-inch and 18 7⅞-inch bits to cut the hole. Average mud weight was 9.7 pounds and maximum deviation of the hole was 2 percent. Six drill collars were carried on the drill string, making for faster time and straight hole.

Following the completion of the Pyle well, Gulf as operator contracted with Falcon-Seaboard to drill the Nichols 1, NE NE NW of Sec. 20-29s-18w, 12 miles west of the Pyle. This test was completed for 15 million cubic feet of gas per day from Mississippian lime between 4997-5003 feet. Total depth is 5630 feet and plug back depth 5043 feet. The gas well is six miles southwest of the Brenham gas pool.

Falcon-Seaboard has offset Gulf's Pyle 1 to the northeast and completed a producer flowing 37 barrels of 40-gravity oil per hour, and is drilling a second offset to the north of the Pyle. Spacing pattern for oil wells is 10 acres and for the gas wells 160 acres.

Both Gulf and Falcon-Seaboard are planning a careful drilling program, and observers are confident that a major new oil and gas reserve is being developed. —**The End**

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• Wildcat Drilling—In May and First Five Months, 1955-1954

STATE or DISTRICT	MONTH OF MAY, 1955						FIRST FIVE MONTHS, 1955-1954									
	New Fields			Total Discoveries	Dry Wildcats	Total Wildcat Tests	New Fields			Total Discoveries		Dry Wildcats		Total Wildcat Tests	
	Oil	Distillate	Gas				Oil	Distillate	Gas	5 Mo. 1955	5 Mo. 1954	5 Mo. 1955	5 Mo. 1954	5 Mo. 1955	5 Mo. 1954
Alabama	..	....	..	....	....	....	..	....	..	..	..	27	30	27	30
Arizona	..	....	..	....	....	....	..	....	..	..	..	4	2	4	2
Arkansas	1	....	1	2	15	17	5	....	1	6	2	54	35	60	37
California	2	....	..	2	40	42	9	....	..	9	9	128	132	137	141
Colorado	4	....	4	8	57	65	19	1	12	32	27	292	171	324	198
Florida	..	....	..	....	2	2	..	....	..	..	1	13	11	13	12
Georgia	..	....	..	....	....	....	..	....	..	..	..	....	3	....	3
Idaho	..	....	..	....	....	....	..	....	..	..	..	2	....	2	....
Illinois	..	....	..	....	46	46	3	....	1	4	11	237	223	241	234
Indiana	..	....	..	....	15	15	7	....	..	7	6	54	97	61	103
Kansas	13	....	3	16	96	112	59	....	16	75	53	359	315	434	368
Kentucky	1	....	..	1	11	12	7	....	1	8	16	35	22	43	38
Louisiana	5	2	..	7	41	48	12	10	..	22	30	174	139	196	169
North Louisiana	..	....	..	....	14	14	1	....	..	1	3	63	48	64	51
South Louisiana	5	2	..	7	27	34	11	10	..	21	27	111	91	132	118
Michigan	..	....	..	....	15	15	2	....	..	2	5	79	98	81	103
Mississippi	..	....	..	....	17	17	2	....	..	2	..	74	61	76	61
Missouri	..	....	..	....	2	2	..	....	..	..	..	13	6	13	6
Montana	..	....	..	....	5	5	1	....	..	1	2	33	33	34	35
Nebraska	1	....	..	1	31	32	15	....	..	15	9	105	43	120	52
Nevada	..	....	..	....	1	1	..	....	..	..	..	4	2	4	2
New Mexico	1	....	3	4	14	18	9	1	6	16	23	58	75	74	98
North Dakota	..	....	..	....	4	4	..	....	..	..	1	16	39	16	40
Ohio	..	....	..	....	3	3	..	....	1	1	..	12	7	13	7
Oklahoma	4	....	..	4	62	66	33	4	8	45	62	234	278	279	340
South Dakota	..	....	..	....	....	....	..	....	..	..	1	4	5	4	6
Texas	41	6	5	52	320	372	212	30	28	270	291	1,646	1,655	1,916	1,946
Dist. 1: South Central	2	....	1	3	33	36	9	3	1	13	19	171	100	184	119
Dist. 2: Middle Gulf	2	1	..	3	20	23	6	5	4	15	14	95	108	110	122
Dist. 3: Upper Gulf	..	1	2	3	34	37	7	8	5	20	16	165	155	185	171
Dist. 4: Lower Gulf-S.W.	1	3	1	5	38	43	10	8	3	21	24	170	162	191	186
Dist. 5: East Central	..	....	..	....	13	13	3	2	..	5	..	57	51	62	51
Dist. 6: Northeast	2	1	..	3	17	20	3	1	..	4	2	67	61	71	63
Dist. 7-B: North Central	12	....	..	12	38	50	59	....	7	66	76	337	357	403	433
Dist. 7-C: West Central	3	....	..	3	26	29	13	....	4	17	27	110	131	127	158
Dist. 8: West	6	....	..	6	48	54	38	....	1	39	53	196	184	235	237
Dist. 9: North	12	....	..	12	47	59	62	....	2	64	53	258	325	322	378
Dist. 10: Panhandle	1	....	1	2	6	8	2	3	1	6	7	20	21	26	28
Utah	..	....	..	....	1	1	2	....	1	3	3	25	10	28	13
Washington	..	....	..	....	....	....	..	....	..	..	..	....	....	....	....
West Virginia	..	....	3	3	2	5	..	....	6	6	..	10	....	16	....
Wyoming	2	....	..	2	21	23	10	....	1	11	39	66	80	77	119
Total United States	75	8	19	102	821	923	407	46	82	535	591	3,758	3,572	4,293	4,163

Wildcatting Lead Gains

5-Months' Total 3 Percent Ahead of '54

By CECIL W. SMITH, WORLD OIL Staff

THIS YEAR'S wildcat drilling continues to hold a small lead over last year's record activity. At the end of five months, new wildcats totaled about 3 percent more than those completed in the same period of 1954, and that was an increase over the 2 percent lead held a month earlier. The year's number was bolstered considerably by May's stepped up operations.

Wildcatting resulted in the completion of 923 wells during the month concluded, and that boosted the year's total to 4293 wells. A year ago at the same time, the count had been 4163, which showed a gain of 130 tests, or 3.1 percent.

Efforts in May were rewarded with 102 new producing areas. These were made up of 75 new oil fields, 19 new gas fields, and eight gas-distillate areas. These new discoveries topped the 95 credited to the previous month, but they did not quite measure up percentagewise. New finds in May amounted to 11.1 percent of all wildcats drilled, while the fewer number in April amounted to 11.8 percent.

SUMMARY OF RESULTS OF WILDCAT DRILLING

ITEM	May, 1955	April, 1955	FIVE MONTHS January-May 1955	1954	Percent Diff.
New Field Discoveries:					
Oil	75	79	407	452	— 10.0
Distillate	8	6	46	43	+ 7.0
Gas	19	10	82	96	— 14.6
Total Discoveries	102	95	535	591	— 9.5
Dry Wildcats	821	711	3758	3572	+ 5.2
Total Wildcat Tests	923	806	4293	4163	+ 3.1
Percent Productive	11.1	11.8	12.5	14.2	.....
Percent Dry	88.9	88.2	87.5	85.8	.....

Neither month lived up numerically to the year's five-month average, which figures 12.5 percent successful. So far this year, the score for wildcatters has been one successful test out of every eight drilled.

Despite this year's fairly good success ratio, it has not measured up to the pace set early last year. In the first five months of 1954, 14.2 percent of all wildcats completed were commercial producers of oil, gas, or distillate.

This year's discoveries totaled 535 in five months, while 591 were recorded in the comparable period of 1954. That amounted to a 9.5 percent decline, and at the same time dry holes were increasing 5.2 percent.

Oil discoveries totaling 407 in five months dropped 10 percent from the 452 made in the same period of last year. New gas fields numbered 82 and that was a decline from the 96 found a year before. The only type of discovery showing an increase this year is gas-distillate. New distillate areas opened totaled 46 to last year's 43.

Wildcat failures during the first five months of this year numbered 3758, and a year ago 3572 had been drilled.

Selecting a Radio System for Drilling Operations

Here is a general description of the various types of petroleum radio systems covering the capabilities, limitations, cost, and operating features of each.

FIGURE 1—Typical 60-watt portable FM radio station for use on drilling rigs.

By JERRY S. STOVER,
Communications Engineering Company, Dallas

IN DRILLING OPERATIONS, time is generally of the essence. The quicker information is passed between drilling rig and other personnel the more efficient the operation. Field radio communication offers an invaluable link in this communications problem.

Because field radio application is becoming so widespread, toolpushers and petroleum engineers may frequently be called upon to consult with the radio engineer in the design of a system for their company's particular operations. The engineer or toolpusher with a working knowledge of radio can be of material assistance in the system design. This article is designed to provide a general description of the various types of petroleum radio systems, capabilities, limitations, cost and operating features.

Drilling operations. Radio communication was first used in drilling operations shortly after World War II, when rugged FM (frequency modulation) equipment suitable for the severe operating conditions of drilling rig use was developed. The basic drilling rig system consists of a station installed on the drilling rig and a mobile station installed in the toolpusher's car. This provides communication with the rig at all times, enabling the pusher to contact the rig to see what supplies are needed before driving out from town. More important, the rig is able to contact him at any time.

Special extension control units can be plugged in so the toolpusher can receive and send messages from his bedside at night using the station in his car. Because the antenna of the drilling rig station is located atop the 120-foot derrick, this basic system, a rig unit and car unit, has an operating radius of approximately 35 miles, and costs approximately $1800.

Oil companies or drilling contractors that operate a number of rigs within a 60 to 100-mile radius of a field office frequently install stations at the office. Drilling reports, requests for supplies, orders, etc., can be transmitted directly between the office and rig at any time. If the office is closed at night, a remote control unit is often installed in one of the employe residences to permit handling of emergency night calls. An office station with an operating radius to drilling rigs of 50-60 miles costs approximately $1000.

A more powerful station, with high antenna for communication range up to 100 miles, costs $6000 to $8000. Even greater ranges can be obtained by using base station and automatic repeater systems. Oil companies and drilling companies have installed extensive systems, which enable them to talk directly from a central division office to an area as large as the entire Permian Basin.

Drilling radio systems may be owned and operated either by the drilling contractor or the oil company, which may install its own equipment on either its own rigs or contractors' rigs. Some oil companies use radio only in the cars of engineers and geol-

ogists who are following drilling operations.

In designing radio equipment for drilling rigs, special attention must be given to the available power supply. If the rig is equipped with generators or has other electrical equipment necessitating 24-hour operation of the utility plant, 110 volt AC equipment can be used with rotary power converter to change the DC voltage of the utility plants to 110 volt AC. If primary power is not available during the day, it is necessary to use battery-operated equipment with provisions for charging the battery during the night while the utility plant is operated. The cost of either system is approximately the same, although the maintenance on the battery system is somewhat higher due to the battery and its charging system.

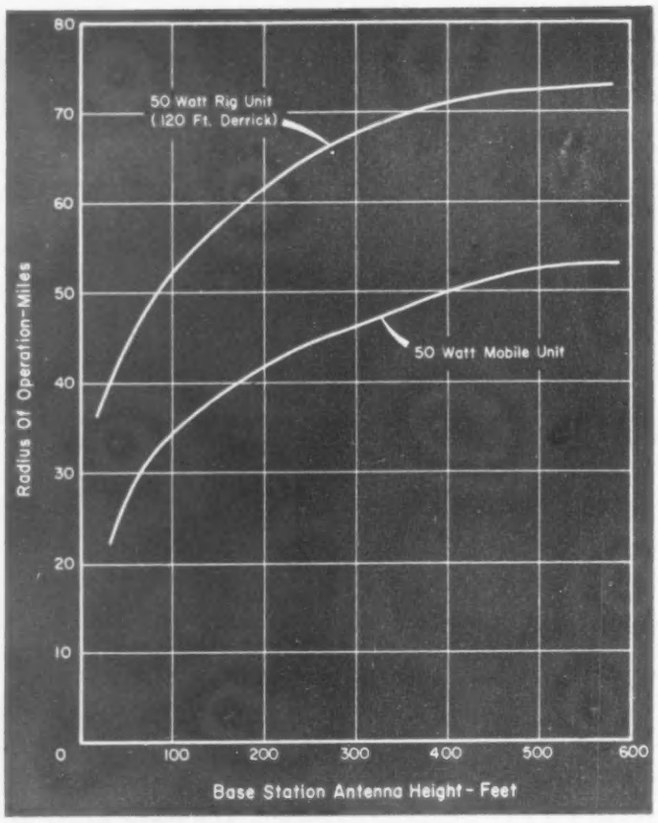

FIGURE 2—Effect of base station antenna height on operating range to radio units installed in cars or on drilling rigs (40-50 mc frequency).

Rig radio equipment is normally mounted in portable steel cabinets together with special "quick change" plugs and connectors, enabling the crew to readily move the equipment when changing locations. A typical 60-watt drilling rig station is shown in Figure 1.

Licensing. All radio stations in the U. S. must be licensed by the Federal Communications Commission. The FCC has established a Petroleum Radio Service, assigning channels for use by companies engaged in drilling, production, and transmission of petroleum. Service and supply companies, together with oil field construction companies are eligible under the Special Industrial Radio Service, using frequencies separate from those of the petroleum service.

At the present time, most petroleum industry stations operate in the 25-50 mc portion of the radio spectrum, because longer range operation is possible at these frequencies. Two other bands used by the petroleum industry are the 150 mc and the 450 mc band. The 150 mc band has medium range, and the 450 mc band has rather short range, making it useful for local gas distribution or refinery operations.

At the present time, all frequencies in the 25-50 mc band are allocated with a spacing of 40 kilocycles between channels. The Radio committee of the API has a petition before the FCC at this time, requesting that the spacing be changed to 20 kilocycles, which will effectively double the number of channels available. This petition was filed after tests made by the API indicated successful operations could be carried out using the lesser spacing, or "narrow band" equipment, as it is commonly called. Recognizing the trend toward narrow spacing, many companies for several years have been installing narrow band equipment, which will not require changes when the channels are split. Other companies which install wide band equipment will be able to convert for operation on the 20 kilocycle spacing at moderate cost.

Before any company can obtain a license in the Petroleum Radio Service, it is necesaary to obtain a frequency recommendation from the National Petroleum Radio Frequency Coordinating Association. This is an association of users on a regional basis which keeps complete records of all frequency assignments so that channels can be loaded equally. A similar association for the Special Industrial Radio Service, which includes the various service and construction companies, has been organized but the frequency coordinating function has not yet been established. FCC is currently allocating special industrial frequencies in an effort to obtain equal loading on the available channels.

System design. The detailed techniques of two-way radio system design are beyond the scope of this paper but several basic requirements, which may serve as a guide in preliminary planning, will be covered. Best performance is obtained from any machinery or device only when it is designed to meet the particular application. This is particularly true in petroleum radio systems where there are frequently unusual requirements, either as to coverage, reliability, or provisions for future expansion. There are radio companies engaged primarily in the design and installation of petroleum radio systems. In addition, the radio manufacturers frequently have engineers who have specialized in petroluem applications of radio.

The range of a two-way radio system generally depends on the antenna height above ground. For this reason, the range between two mobile units is limited to approximately 15 miles. The range betwen a mobile unit and its base station will depend to a large degree upon the height of the station antenna tower. Figure 2 shows the radius of coverage to radio-equipped vehicles and drilling rigs for various base station antenna heights. These are average figures for terrain common to the Southwest.

Figure 2 shows how the range increases rather rapidly as the antenna height is increased up to approximately 150 feet, and then begins to increase more slowly. Although the coverage in square miles is still increasing rapidly, the operating radius increases more slowly as the tower height is raised. The cost per tower foot increases sharply as the tower begins to exceed 200 feet due to the increasing size of the tower section and additional CAA lighting. For this reason, it is seldom economical to exceed 300 feet in tower height for the average base station.

Regardless of the height of tower used, it is important that the base station be located at a site that is free

from outside electrical interference. Interference which may emanate from built-up industrial areas, neon signs, machine shops, heavily traveled highways, etc., will raise the noise level at the base station. Signals from mobile units must override this excessive noise level and will not be heard as far from the station as would be the case if the tower was located in a quiet area.

To obtain maximum operating range, the base station should be located away from the built-up areas of town and remotely controlled by telephone lines from the office. If there is any question about the proposed site, it should be checked by actual measurements, using portable instruments, which most radio engineers can provide.

If the base station location is reasonably quiet, the two-way communication range of a system using a 60-watt base station is usually limited by the "talk-out" range. The mobile unit must of necessity operate in noisy locations along highways, downtown areas, or well locations, where pumps, utility plants, etc., are generating extraneous noises. For this reason, 250-watt transmitters are often used at base stations so that the extra "talk-out" power will override the high noise level which may prevail in the vicinity of the moible unit.

Frequently the base station may not be located in the geographical center of the area where mobiles are to be operated. Directive antennas can be used to focus the coverage over the desired operating area. In many instances this may result in substantial economies in tower cost. A directive antenna having a power gain in a particular direction of four times (6 decibels) will deliver essentially the same operating range in that direction as a non-directive antenna at twice the height.

Maintenance. Because the mobile radio equipment used by the police and power companies prior to the war required considerable maintenance, it was normal practice for each radio user to employ an engineer to handle service. Wartime developments of tubes and components having higher reliability greatly reduced the amount of service required, making it uneconomical to keep one man on the staff just to service 50 or 60 radios in a particular area.

Since the war, therefore, most companies using radio have found it more economical to contract the maintenance of radio with outside agencies. This is particularly true of the oil fields where radio operations are widely scattered. It is estimated that 85 percent of oil field licensees use outside maintenance service. The remaining 15 percent is composed primarily of pipe lines who still use their own communications departments for the maintenance of their wire lines, microwave, mobile radio, and telemetering.

Radio maintenance is handled either by individual contracts with local service men in each locality or by a single contract with one of the several radio communication companies that specialize in mobile radio maintenance throughout the oil field areas.

Contract service is generally provided on a flat rate or "service policy" basis with the charge for mobile units $7.50 to $10 per month, and stations $25 per month. These figures include labor, tubes, parts and mileage.

Radio economics. To properly evaluate the economics of radio, it is useful to translate the investment and operating expense into terms of daily operating cost. As noted previously, the basic drilling system consisting of a rig and car equipped with radio costs approximately $1800, or $30 per month, based on five-year depreciation. The maintenance on this basic system is approximately $30 per month, resulting in a total radio cost of approximately $2 a day per rig.

A typical production or service company system, designed for an operating radius of approximately 50 miles would consist of a 250-watt base station with 280-foot tower, representing a station investment of approximately $6000. Twenty 60-watt mobile units at $600 each would make the over-all radio investment $18,000, or $300 per month, again based on five-year depreciation.

Maintenance on such a system is approximately $175 a month and miscellaneous costs, such as electric power, land rental, etc., would perhaps add another $25, making an over-all monthly cost for the system of $500. When apportioned among the twenty radio-equipped mobile units, the total radio cost is less than $1 per day per vehicle.

Whereas the reductions in vehicle mileage alone frequenty will offset the cost of radio, reduced down time on rigs ond increased utilization of expensive rolling stock provide the major benefits derived from effective use of radio communications in the oil industry. Wherever heavy machinery, men and materials are on the move, rapid field communication is an important contributor to efficiency and safety.

ACKNOWLEDGMENT

Prepared for WORLD OIL from a paper: "Radio Communications in the Petroleum Industry" presented at the Fall Meeting of the Petroleum Branch, AIME, in San Antonio, Texas, 1954.

—The End

THE ECONOMICS OF OPERATING A RADIO SYSTEM

THE COST PER RIG . . .

Basic Investment	**$30 per mo.**
Maintenance	**$30 per mo.**
TOTAL	**$60 per mo.**

Approximately $2 per day per rig

THE BENEFITS . . .

- **Reduction in vehicle mileage**
- **Reduced downtime on rig**
- **Increased use of expensive rolling stock**

We were rewarded with rebates and rate reductions from the insurance carrier when . . .

We Reduced Our Accident Frequency by 40 Percent

By BEN WEST, Safety Director,
Thomas P. Pike Drilling Company, Los Angeles

About the Author

BEN WEST went to California 40 years ago at the age of nine months. His family followed the early California oil discoveries from Fellows, Calif., to Signal Hill, Huntington Beach and Bakersfield, where he graduated from Bakersfield College. He has worked as a roughneck or a driller in most of the California oil fields. Following a tour in the army he rounded out his experience in the petroleum industry by selling equipment for such firms as HOMCO, H. C. Smith and the American Iron and Machine Works of Oklahoma City. He joined Thomas P. Pike Drilling Company as assistant to the drilling superintendent from which job he graduated to his present position of safety director.

LIKE ALL OTHER drilling contractors, our firm had taken measures from time to time to reduce the number of accidents in our field operations. We had provided the usual safeguards for the workers and made what we thought were sincere efforts to impress upon them the necessity for taking precautions at all times. The results were far from satisfactory for the reason that we had no definite program which would enable the entire force to act as a group. Instead of making a special study of the causes of our accidents, we were trying to deal with the effects in a hit-or-miss fashion. When our accident frequency continued to climb in spite of our own efforts to reduce it, we decided that expert counsel from an outside source might get better results and uncover the causes of the accidents so that they could be dealt with in an orderly manner, and develop a program which would help to avoid them.

One year and a half ago we engaged a safety engineering consultant to make a survey and develop such a program. Today, our accident frequency rate for the entire period averages 40 percent below what it was when we started our new safety program activities, with corresponding reductions and savings in the insurance premiums and compensation costs.

The program and objective. When we began the intensive study of the causes of the accidents which were resulting in such losses in manpower and expense, it was immediately apparent that there would have to be a parallel activity on the part of the management to implement the program or no outstanding results could be expected. The writer was therefore appointed safety director to work with the safety consultant and drilling superintendent on the theory that any background of experience as a toolpusher and practical field man would help us to win the support of the drillers and pushers to make the safety drive a success. It was and it is our considered opinion that no safety program can be fully implemented without that support.

Meetings with pushers. Before describing the program which reduced our accident frequency rate by such a heavy percentage, it may be well to mention one feature of our management system which has a bearing on the working of our program and possibly helped to make it a success.

We operate under a system of incentive management with profit sharing, whereby the employes at every level of the personnel are given the opportunity to share in the responsibilities of management. To that end, we have advisory board meetings where the executive officers of the firm meet with drillers, pushers, office workers and members of the operating crews to formulate company policy, discuss current operations, review financial matters and issue recommendations agreed upon by those present. The minutes of these meetings are printed in the company house organ, *The Monthly Tour,* and distributed to all personnel of the firm. Thus, in our initial moves to enlist the cooperation of the supervisory force in the field operations, we had a common meeting ground for discussion.

Our first move was to meet with a management advisory committee and outline the program. When it was agreed that the outline of the plan was adequate, we then proceeded to meet with the tool pushers to develop with them the details of the program and solicit their cooperation. This meeting was followed by a meeting with the drillers showing them the steps that were to be taken and the part that they would be expected to

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THOMAS P. PIKE DRILLING COMPANY **Nº 276**

Accident Investigation Report

EMPLOYEE'S NAME ..... STREET ADDRESS .....

AGE ..... OCCUPATION ..... CITY ..... STATE .....

WELL NAME ..... RIG NO. ..... LOCATION .....

DATE OF ACCIDENT ..... TIME ..... ☐ A. M. ☐ P. M. MARRIED ..... SINGLE .....

Check Items	CIRCUMSTANCES OR CAUSE OF INJURY	Check Items	PART OF BODY Right ( ) Left ( )		Check Items	NATURE OR TYPE OF INJURY
	1. STRUCK BY OBJECTS: Tongs, Elevators, pipe, spinning chains, (no free falling objects)		201 Scalp 202 Forehead	HEAD		301 Abrasions 302 Amputation 310 Blister
	2. CAUGHT IN, UNDER OR BETWEEN OBJECTS: Pipe, tong, elevator, latches, catlines, sheaves, etc. (no machinery)		203 Face 204 Nose 205 Mouth			311 Bruise 312 Burn
	3. FLYING OBJECTS: Mostly steel particles (and eye injuries) from acts of hammering, grinding, etc.		206 Teeth 207 Ears 208 Jaw	FACE		320 Concussion 321 Crushing 322 Cut
	4. FALLS (AND SLIPS) ON SAME LEVEL: Stumbling, tripping, slipping on or over odd objects, oil, water, mud, etc.		209 Eyes			330 Dislocation 340 Foreign Body 341 Fracture
	5. MUSCULAR OVEREXERTION: Mostly abdominal and back strains from lifting		220 Neck 221 Shoulder 222 Chest-Ribs			342 Fumes effect 350 Heart condition 351 Hernia
	6. HAND TOOLS: Mostly wrenches and hammers		223 Abdomen 224 Back 225 Groin	TRUNK		360 Infection 361 Inflammation 362 Internal Upset
	7. BURNS: Mostly welding (Ray), burns of eyes and burns from exploding gas – rest miscellaneous		226 Hips			370 Laceration 380 Pain & ache
	8. HARMFUL SUBSTANCES: Acid, lime, drilling mud, caustic soda also inhaled gases or fumes.		230 Arm-Upper 231 Elbow 232 Forearm	ARM		381 Puncture Wound 390 Sprain 391 Strain
	9. STRUCK AGAINST OBJECTS: Most hand injuries, (cuts, punctures, etc.) from handling pipe, etc.		233 Wrist			392 Shock 393 Swelling
	10. FALLS FROM HEIGHTS: Derrick floors, pipe racks, sub structures into cellars, from trucks, etc.		240 Hand 241 Finger – 1, 2, 3, 4, 5.	HAND		399 Multiple 355 Miscellaneous Describe:
	11. MACHINERY: Mostly catheads, belts and pulleys, engine fans, mud pump packing glands, etc.		250 Thigh 251 Knee 252 Shin	LEG		
	12. FREE FALLING OBJECTS: Tools, bolts, braces, thribble boards, other misc.		253 Ankle			
	13. ALL OTHER ACCIDENTS: Motor vehicles, electric shock, heat exhaustion, sunstroke, etc.		260 Foot 261 Toes – 1, 2, 3, 4, 5. 280 Unclassified	FOOT		

FIRST AID ☐ ☐ Sent to Doctor ..... Name ..... Address ..... ☐ Lost time, if known: .....

☐ Sent to Hospital ..... Name ..... Address ..... ☐ No Lost Time

REMARKS: (Give brief description of what employee was doing when accident occurred):

.....

.....

TO BE COMPLETED BY DRILLER – Analysis of Cause

.....Faulty Instructions	.....Lack of Concentration	.....Defective Equipment	.....Mentally Unfit	.....Poor Housekeeping
.....Inability of Employee	.....Unsafe Practice	.....Unsafe Structure	.....Improper Working Conditions	.....Improper Planning
.....Poor Discipline	.....Physical Hazards	.....Physically Unfit		.....Improper Apparel

Were any safety rules violated? .....

Driller's recommendations for prevention of future accidents of this kind .....

.....

.....

.....

Date of report ..... Driller's Signature .....

Pusher's recommendations for prevention of future accidents of this kind .....

.....

.....

.....

Date ..... Pusher's Signature ..... ☐ Regular ☐ Night ☐ Relief

COPY 1

play in the over-all attack on our high rate of accidents. An important detail of the instructions which this latter group received was that following the pusher's safety meetings with them, they were in turn to hold meetings with their crews to bring the safety instructions directly to the crewmen's attention.

The report forms. When the preliminary analysis of company accidents and their cause, for preceding years, had been made (in consultation with a representative of the insurance company) it became apparent that the report form previously used was inadequate for compiling the information needed to bring the accident picture into proper focus. The previous form was one which was primarily used for filing claims with the Industrial Accident Commission and was unnecessarily complicated. Furthermore, it did not provide sufficient information to compile statistics of the type most desirable for our planned accident prevention work.

It was decided that a form was required which would fulfill the following functions as well as furnish the needed statistics and

- Show the various drillers their individual safety records.
- Provide comparisons with the records of other drillers.
- Develop a spirit of competition for safety records.

A form was devised by us which we are pleased to learn has since been adapted to the needs of The American Association of Oilwell Drilling Contractors and others in the trade. This form has the virtue of eliminating unnecessary write-ups by using a checklist system for answering questions. By checking questions, the driller can identify the circumstances of the accident, the part of body injured, as well as given an analysis of cause, all of which aid in statistical classification.

Supplementing this form, we adopted an accident summary form for monthly reports to the drillers and pushers which tells them how many accidents have happened, what appeared to be the cause and the cost to the company . . . a vital point in a firm like ours where employes share in the profits.

These latter forms summarize the accidents monthly and quarterly, state the circumstances and the area of body injured and identify the rig, driller and pusher in charge. The form is so arranged in columns, headed by the rig numbers and the driller's names, that the reader may cross-check for comparisons with the records of other rigs . . . a feature which tends not only to show up deviations from normal performance but stimulates efforts to reduce the number of accidents which make the supervisor's record look bad.

Appealing to employes' self interest. In presenting our program, there had to be some convincing basis of appeal which would enlist the cooperation of the field men, aside from the usual directives from headquarters. We had been warned by two experts to avoid mention of money losses to the firm and stick to the humanitarian aspects of the situation; bearing down on the dangers and the sufferings of the individual and his family when accidents occurred. We did this in the early meetings with the field men, because it has been part of our management philosophy to consider every individual employe as a man with rights which must be considered at all times. Nevertheless, we noticed that the discussion was continually slanted to the subject of monetary losses and their effect on the company profit sharing fund, the retirement fund and other employe benefits, even the effect on our reputation for trouble-free operation.

We noticed that the question and answer period continually veered to the subject of the costs of some particular injury, the doctor's fee, the hospitalization expense and the effect on the other workers participation in the profits. It became apparent with-

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out any question as meetings went on that the cost of accidents was a subject which caught the imagination of the workers because they had become aware through our profit sharing plan of an ultimate effect on their own earnings.

The fact that we operate under the system of incentive management with profit sharing, mentioned above, undoubtedly makes this factor of more interest to our employes than it would be to those of a firm operating without one, but in the long run, continued employment for the workers depends upon the success of the firms employing them, and it therefore seems reasonable to assume that this same appeal might well be stressed by other firms regardless of the existence of special company benefits in which they may participate.

Implementing the program. When the preliminary analysis of the company's accident records had been made, and the report forms designed, we were ready to present the program to the field personnel and show them the advantages of cooperating with the management to make it work. A series of meetings was held with our safety engineer consultant, the insurance company engineer and this writer, at two locations which were more or less central to the working rigs. The daylight tour drillers were invited to attend on their own time at dinners where the firm paid for the meals. The attendance was good.

The business of the meeting consisted of:

- Statistical review of the company's accident record.
- Review of the new accident report form and discussion as to its use and merits.
- Analysis of typical accident report forms and discussion of causes.
- Review of an educational booklet, titled "Safety and the Driller."
- Discussion of methods for developing interest in the drillers' crew meetings.
- A question and answer discussion of safety measures and methods.

In order to insure improved coordination and continued effort at all levels of supervision for the program, a directive was issued by the drilling superintendent which specified that:

1. Each district drilling superintendent was to hold a safety meeting with all his pushers at least once a month to review the accident records and offer suggestions for improvement.
2. Each pusher was to hold meetings with his drillers at least once a month. Notes on the meetings were to be sent to the district superintendent to be relayed in turn to the drilling superintendent within seven days.
3. Each driller was to hold a safety meeting with his crews at least once every two weeks. The driller could, if he wished, request the presence of his pusher, and/or the safety director at any of his meetings. The date of the meeting was to be noted on the daily well log and a mention of the topics discussed entered in the "Remarks" column.
4. The daylight driller was to make, or have one of his crew make a safety check of the rig each Thursday and report on a safety checklist furnished which was to be mailed immediately to the safety director.
5. It was also provided that a complete safety check of each rig was to be made regularly by the safety engineer of the insurance company, who was to leave a memorandum for the pusher calling his attention to any unsafe conditions found. On the next inspection, if the previously reported unsafe condition was still uncorrected, the insurance company engineer was to advise the safety director who would take appropriate steps to insure correction.

Response of the field force. The response to this program was excellent, and the fact that it continued to operate without the slowing down which usually takes place after the first enthusiasm has cooled off, was undoubtedly due to two principal factors: First, appeal to self interest when it was shown that every accident was a drain on the profit sharing fund of the company; and second, the interdependent nature of the new reporting system which not only checks accidents continuously, and the conditions which permitted them, but places the responsibility where it belongs in the supervisory forces, on a basis which makes failure to cooperate a matter of written record.

Awards. In connection with this program, certain cash awards are given to drillers quarterly for the absence of lost-time accidents on their rigs. These awards may amount to as much as $240 for the year and are an added incentive to obtaining a good safety record and reducing the accident rate.

Conclusion. Oilwell drilling is, of course, generally considered a hazardous business and a certain percentage of accidents may unfortunately be expected while the rigs are being operated by human agencies. The principal underlying cause for casualties lies in the failure of the individual to take necessary precautions in performing dangerous operations. The average man, however, and particularly the younger man, usually believes that accidents are misfortunes which happen to the "other fellow." It is the job of management to show him by facts and figures that this is not so, and then devise a system which compels caution as routine procedure and so standardizes precautionary measures that failure to comply with them will be a matter of record which may indicate unwillingness to cooperate with other members of the crew.

This in the long run is the basis of good management wherever men must work together. Persuasion is often enough with reasonable individuals, but it lacks the permanence and the cumulative results of an orderly system which is the foundation of the teamwork which gets outstanding results.

We have had a year and a half to implement the safety program which has reduced our accident ratio by 40 percent. In that time we have made certain adjustments in the original plan based on actual experience. This year, aside from the reduction in human suffering, we will receive a tangible reward in the form of a rebate and a rate reduction from the insurance carrier. A substantial part of this saving will go into our profit sharing and retirement funds. And since the costs of accidents are a total loss to any firm, the savings we have effected by avoiding them in the last year and a half means so much added to net profit. It is just like finding that money.—**The End**

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A Report on . . .

Deep Drilling in the Appalachian Area

• Deep drilling has come to the Appalachian area, cradle of the U. S. oil industry.

• This development has brought about an increase in the use of rotary drilling, although cable tools still predominate.

• Even air and gas drilling has been used in this area.

• Procedures for cementing casing vary widely as to locale and operator.

By BYRON M. FINCH,
Oil & Gas Management,
Charleston, W. Va.

WHILE CABLE TOOL drilling is still predominant in the Appalachian area, recent developments indicate a gradual trend to the use of rotary-type drilling and completion methods, especially in view of the great number of anticipated deep wildcat tests.

Since most deep wells drilled in the Appalachian area are located in possible natural gas producing regions the article will be confined to drilling and completion examples of wells drilled primarily for natural gas.

Deep rotary drilling and completion. The use of deep rotary drilling and completion methods is progressing rapidly in the eastern area. Drilling contractors are adapting and orienting themselves and their personnel to the hard abrasive formations of the Appalachians.

On December 5, 1951, The California Company completed as a dry hole its A. W. Bennett 1 well, Sullivan County, Pennsylvania, at a depth of 12,343 feet. This is the deepest hole ever drilled in Pennsylvania, and, perhaps in the Appalachian Province. This particular well was a top-to-bottom rotary drilled and completed well and used all of the most advanced scientific knowledge and equipment ever to be utilized in a deep test well in this section of the country.

Table 1 presents certain pertinent drilling and completion facts derived from the drilling of the deep rotary California Company well and the deep cable tool test drilled by the New York State Natural Gas Company.

Some of the most recent rotary drilling and completion work started in the Leidy, Penn., gas field, and operations have since moved to the Driftwood-Benezette, Pennsylvania area. Numerous methods of rotary drilling and completion are now being carried on in the aforementioned Pennsylvania gas fields. The search for oil and gas production has brought about many new deep wildcat tests. This fact, together with the time element, elimination of gas blowouts causing fire hazards, control of high pressures, and elimination of costly

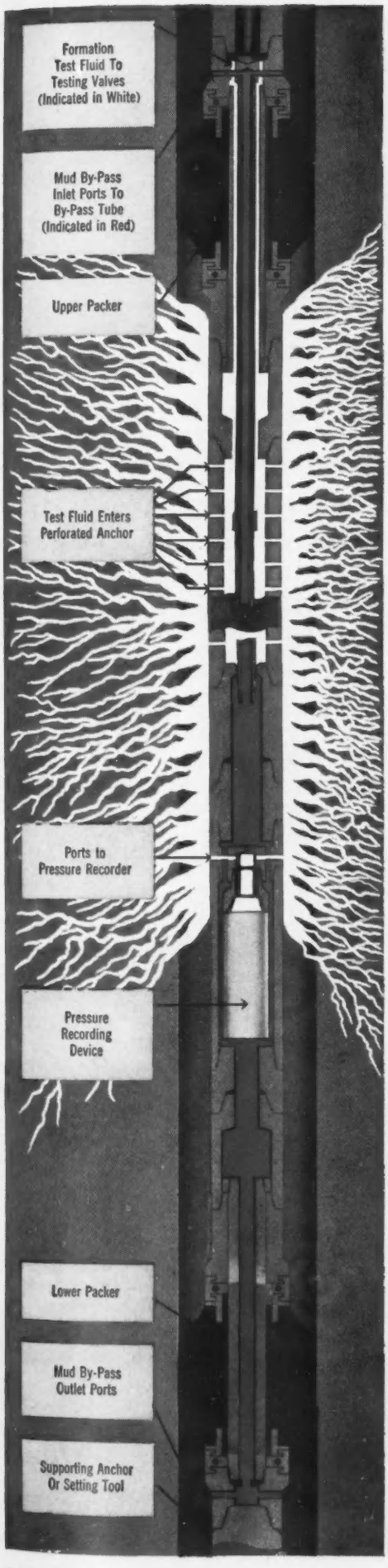
TABLE 1
California Company Deep Rotary Test

Company	The California Co.
Well	No. 1 A. W. Bennett
Location	Sullivan Co., Pa. 4350′ W. of Long 76° 30′; 6700′ N. of Lat. 41° 20′
Elevation	D. F. 1482′; G. L. 1468′
Contractor	Noble Drilling Co., Nat'l. Rotary Rig Type 100
Total Depth	12,343′ Drillers T.D.; 12,317′ Schlumberger T.D.
Drilling Rate	Overall average 48.7′ per day
Bits Used	214 Rock Bits; 9 Conventional Core Bits; 12 Diamond Core Bits
Casing Record	16″—116′; 10¾″—2802′
Remarks	Shows of Gas—Slight traces reported by Core Lab Gas Detector while drilling dark shale section to approximately 8350′. Electric Log—Schlumberger runs to 2806′, 9363′, and 12,317′. Laterlog to 12,313′. Gamma Ray Log 0 to 12,312′.
Results	Dry and abandoned.
Drilled	Spudded March 28, 1951 Plugged December 5, 1951.

Bit Footage	Cored Intervals
0— 2100′—123′	2345— 2360′
2100— 2480′— 47.5′	3542— 3561′
2480— 3542′— 76′	6535— 6551′
3561— 5620′—158′	7371— 7390′
5620— 5860′— 40′	8259— 8404′
5860— 6538′—135′	8439— 8700′
6551— 7371′—273′	10021—10041′
7390— 8260′—174′	10675—10690′
8404— 9635′— 94′	11915—11959′
9635—11710′— 55′	12334—12343′
11710—12334′— 9.9′	

New York State Natural Gas Company
Deep Cable Tool Test

Farm Name	E. C. Kesselring
Well	N-169
Township	Van Etten
County	Cherming
Elevation	1077′
Commenced	May 11, 1948
Drilled to	8371—August, 1949—Shut down
Commenced	Nov. 1, 1951—Drill deeper
Completed	June 3, 1953
Total Depth	11,145′
Open Flow	20,000 cubic feet
Rock Pressure	None taken
Gas and Water Shows:	20 MCF 3036′ Salt water 3090′ Show of Gas 6592′ Salt water show 7180′ Gas Pockets 8800′ and 8888′—Gas Pockets 8972′ and 9187′ Small volume of salt water 11,118′ Large volume of salt water 11,140′
Casing	13⅜″ Conductor 10¾″—926′—4″ 7″ —6615′—9″ Cemented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Four Comparative Rotary Drilled and Completed Deep Wells, Leidy, Driftwood Fields, Pa.

TOP TO BOTTOM TYPE DRILLING METHOD

OPERATOR	WELL NAME	County, State	Total Depth	Total Rotary Footage Drilled	BIT RECORD		Total Drilling Days	Av. Rate of Penetration per Drlg. Day	Total Overall Completion Days
					Total Bits	Av. Foot per Bit			
Keta Oil and Gas Co..	State of Pa. No. 2—Tract No. 19	Cameron, Pa.	7034′	7034′	43	163.5	31½	223.3	45
COMBINATION CABLE TOOL—ROTARY TYPE METHOD									
P.L.C. and D. Co.....	State of Pa. No. 8—Tract No. 6	Clinton, Pa.	6886′	6156′	41	150.1	53	116.1	96
COMBINATION CABLE TOOL—ROTARY—CABLE TOOL METHOD									
N.Y.S.N. Gas Co.....	W. E. Joseph No. 2	Clinton, Pa.	6758′	4135′	13	318	28	148	115
COMBINATION ROTARY—CABLE TOOL TYPE METHOD									
Keta Gas and Oil Co..	State of Pa. No. 2—Tract No. 20	Cameron, Pa.	6380′	6340′	40	159.5	31	204.5	31

Legend: P.L.C. and D. Co.—Pipe Line Construction and Drilling Company.
N.Y.S.N. Gas Co.—New York State Natural Gas Company.

fishing jobs, has been the prime reason for bringing rotary drilling to the eastern area.

Different methods. The several different methods of rotary drilling and completion being used at the present time in the Pennsylvania gas fields are:

- Top-to-bottom drilling and completion.
- Combination cable tool-rotary type.
- Combination cable tool-rotary-cable tool.
- Combination rotary-cable tool.

Table 2 indicates one well for each rotary type well drilled and completed in the Leidy-Driftwood area by the four methods.

Commencing, or "top-holing," the well with cable tools and completing to total depth with rotary tools is one of the widely used combination type drilling programs. Some operators prefer to "top hole" the well with cable tools, move in rotary tools and drill to the casing point in the Onondaga limestone and set pipe, move the rotary off the hole, and drill in with cable tools.

According to some producers, "top holing" the well with cable tools, which in effect means drilling the first 500 to 800 feet and setting surface casing, reduces costs, in addition to speeding up the drilling program.

Deep rotary-drilled wells are completed by using different methods. They are:

- Drill through the Oriskany sand, run casing, and perforate the pipe at the pay section; bail drilling fluid down below equalization point of pressure, thereby allowing the well to clean itself.
- Drill hole to casing point in top of Onondaga limestone, run casing, drill through Oriskany sandstone, and follow same bailing procedure.
- Drill hole to casing point, run casing, drill through Oriskany sand, and run string of 2-inch or 3-inch tubing to wash-in well.
- The newest drilling and completion method is to use air to drill the well to casing point in the top of the Onondaga limestone; run casing, and proceed to drill through the Oriskany pay section with natural gas.

TABLE 3

End Results—Air Drilling

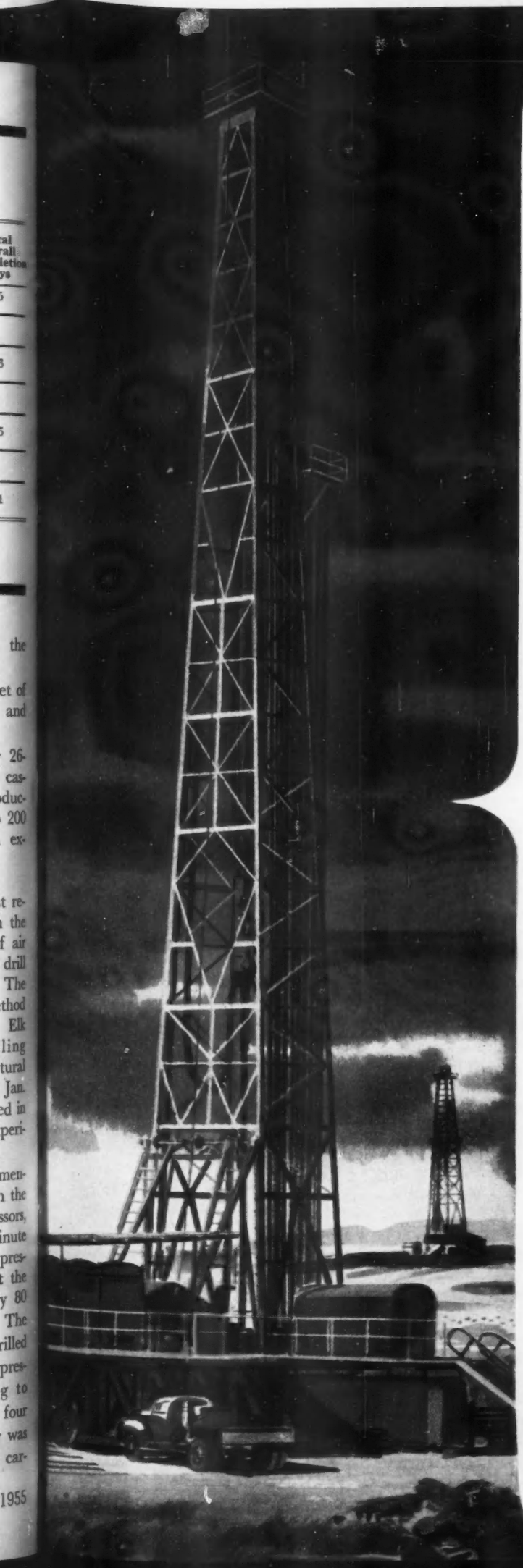
Company.....	New York State Natural Gas Co.
Well.....	Well No. 384, State Tract No. 32
County.....	Elk County
State.....	Pennsylvania
Total Depth...	7176′ Drilled to 7138′ (7″ casing point with air) Drilled 7138′ to 7176′ (through Oriskany sand with gas)
Completion Time.....	20 Over-all days 230:39 actual drilling hours 197.42 Feet per bit 27.83 Feet per drilling hour 320.75 Feet per day

A typical casing program in the deeper rotary wells is as follows:

- Approximately 500 to 800 feet of 10¾-inch set for surface string and cemented from top to bottom.
- Seven-inch outside diameter 26-pound or 5½-inch OD 17-pound casing run as production string. Production string cemented with 100 to 200 sacks of cement, depending on expected pressures.

Air and gas drilling. The most recent rotary drilling procedure in the Benezette, Penn., field is that of air drilling, with gas being used to drill the Oriskany sand pay section. The first gas well completed by this method was the 384, State Tract 32, Elk County, drilled by Delta Drilling Company for New York State Natural Gas Company. (See WORLD OIL, Jan. 1955.) Certain facts are presented in connection with this first experimented well. (See Table 3.)

Air for drilling the above-mentioned well was provided through the use of two compounded compressors, each with 600 cubic feet per minute capacity and with a maximum pressure of 120 pounds. Throughout the drilling process, approximately 80 pounds of air pressure was used. The Oriskany sand formation was drilled with natural gas at a maximum pressure of 400 pounds. According to Delta Drilling Company, three to four million cubic feet of gas per day was used in the drilling. A tungsten car-



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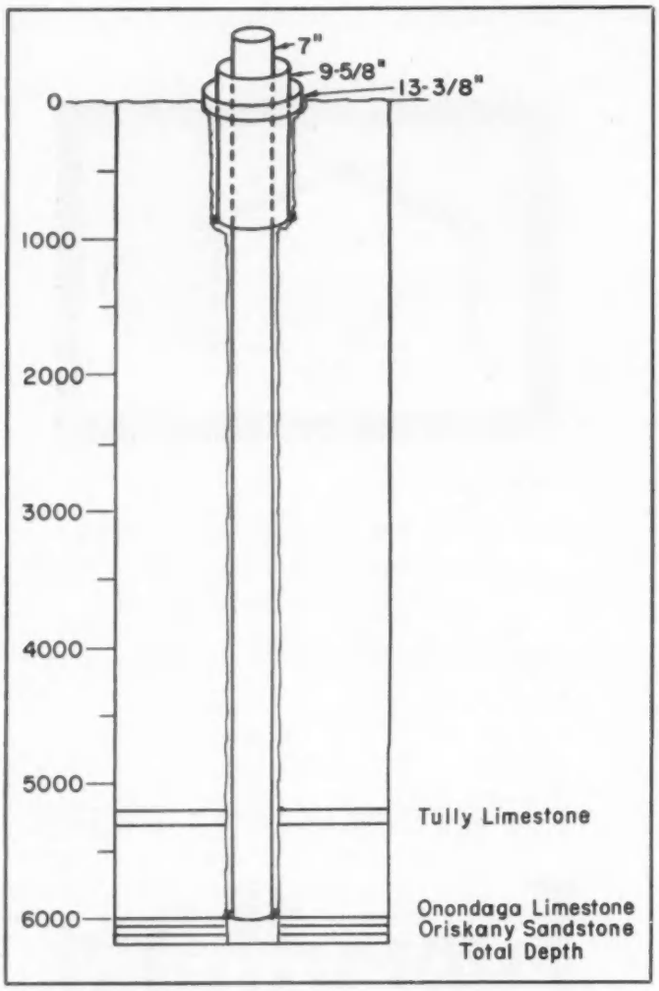

FIGURE 1—Casing diagram, Leidy Oriskany Gas Pool, showing typical casing requirements.

bide-type bit was used to drill the pay sand. Later two wells were drilled by Delta Drilling Company for the New York State Natural Gas Company in the same area using three compounded compressors, instead of the two used on the first well.

Deep cable tool drilling and completion. Deep cable tool drilling and completion practices used by most operators in the east follow generally the same type of procedure.

The proposed depth of the well to be drilled controls the size of hole started. In most instances, 16-inch casing or 13⅜-inch casing is run as the conductor pipe. In the coal bearing regions, various amounts of 10¾-inch and 8⅝-inch casing are run to protect the coal seams, as well as to shut off water from the various sands since water impedes the cable tool drilling process. The production string of casing is usually 7-inch OD 20- or 23-pound pipe, usually set in a limestone formation. The 7-inch casing in West Virginia is set in the top of the so-called "Big Lime," or Greenbrier limestone; however, in the deep Oriskany sand wells, the production string of casing is set in the Onondaga limestone. In Pennsylvania, the production string of casing is also set in the top of the Onondaga limestone. Some producers use 5½-inch instead of 7-inch casing as the production string.

Cementing practice and casing programs. Procedures for cementing casing vary widely as to locale and to operators. Pressures are a controlling factor in some fields. The thinking, generally, is to use as little cement as possible in order to recover the maximum amount of casing in the event of a dry hole. The water strings of 10¾-inch and 8⅝-inch casing in many wells are run on a steel casing shoe. Some operators bevel the end of the first joint of pipe in the hole, rather than use a steel casing shoe. In many wells, the 10¾-inch and 8⅝-inch casing is not cemented. However, if the casing is cemented, the pipe is raised up off bottom, a few bags of cement are dumped in the bottom of the hole with the bailer, and the casing is set down in the cement.

The long or production string of casing is usually 7-inch pipe; however, in some cases, 5½-inch casing is run as the production string. Ten to 25 bags of cement are dumped with the bailer in the bottom of the hole, and the pipe is set down in the cement as aforementioned. It must be remembered, however, that certain situations may arise which cause the operator to deviate in some cases from this type of cementing practice.

Figure 1 presents a casing diagram for an Oriskany sand well and shows typical casing requirements.

Drilling-in and completion. Various producers differ as to their ideas with respect to testing the various pay sections of producing formations encountered as the well is drilled. Two methods are generally followed:

- Testing the different pay zones as they are encountered in the drilling.
- Drilling the well to total depth and then plugging back to each individual pay zone and testing.

The first method is the more widely used.

After the production string of casing has been set, drilling proceeds through the "Big Lime"; however, in the event a show of gas is encountered, practice is to shut in the well and allow it to build up pressure in order to test the production string of casing. In the event sufficient quantities of gas are found in the "Big Lime," drilling is stopped at the base of the formation, and either 2-inch or 3-inch tubing is run and set on various type packers. The packer is set above all gas shows with a perforated joint of tubing on the bottom of the string. The entire section of "Big Lime," ranging in thickness to 1600 feet, is then acidized. Some thought and experimentation is being given and tried by operators to selectively acidize, and in some instances this procedure has shown remarkable results.

In the event that production is not found in the "Big Lime," the well is drilled ahead through the "Injun" and Berea sands and then on through the Devonian shales. If production is found in any of the foregoing formations, proper records are kept as to volumes and pressures; however, the well continues drilling to total depth. When total depth has been reached and pay sections have been encountered in any of the formations below the "Big Lime," the procedure used by many operators is to shoot with various types of explosives the entire section from the top of the Berea sand

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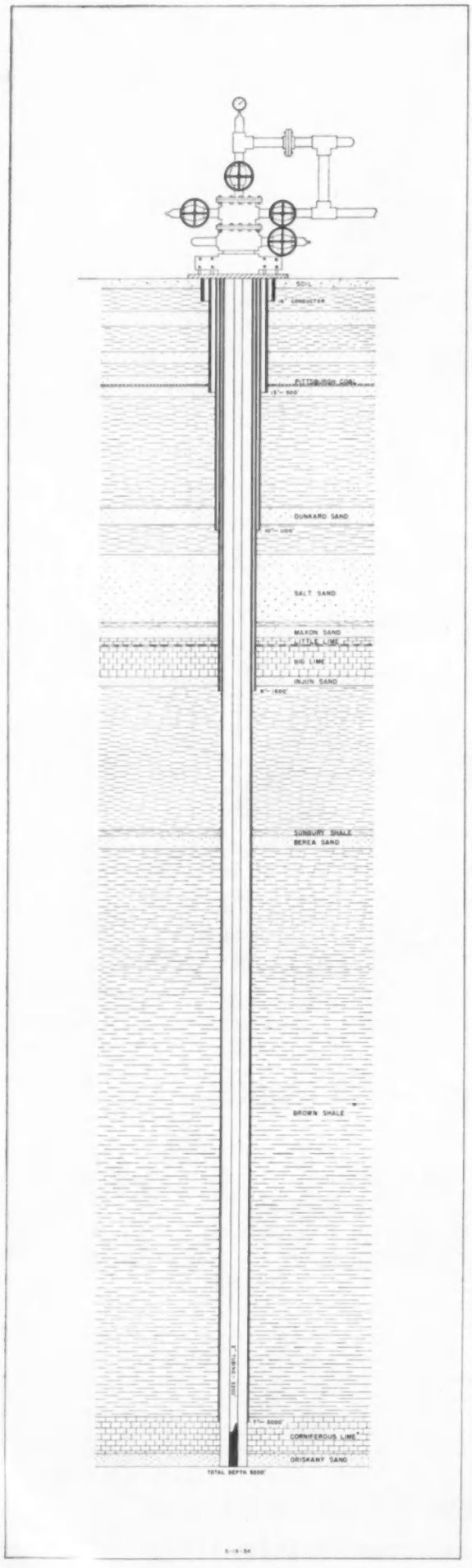


FIGURE 2—Oriskany well casing program and wellhead control equipment.

to the bottom of the Devonian shale. The interval shot may run as much as 1700 feet in thickness.

Cleaning out the well after this type of shot is sometimes the next step in completion; however, many producers make no attempt to clean out after the shot. The well in this case is simply turned into the pipe line and allowed to flow through the 7-inch or 5½-inch production string.

Should the well be drilled on to the Oriskany formation, the same type of procedure as outlined above is followed, except that the production string is run in the top of the Onondaga limestone. If the Oriskany gas makes distillate or casinghead gasoline, the well is then tubed with 2-inch or 3-inch tubing and the distillate run into tanks, with the gas flowing into the pipe line. In many of the Oriskany wells, a string of tubing may be run regardless of whether the well is making distillate or some water. Oriskany wells in Pennsylvania produce dry gas, and the majority of deep wells are allowed to flow directly into the pipe line through the 7-inch or 5½-inch casing. If and when water invades the hole, the practice generally is to keep the water bailed out of the hole until such time as the well is so depleted that it becomes necessary to plug the hole.

Figure 2 is a typical representative cable tool test well showing formations encountered, casing and tubing program, and completed well-head hookup in the State of West Virginia. The drawing was made from a working model showing the method used by the United Fuel Gas Company in drilling and completing a deep Oriskany gas well. In the author's opinion, this drawing presents a complete sketch of a tentative deep well program drilled with cable tools. However, some deviations in the casing program and well hookup may occur among differently thinking operators.

ACKNOWLEDGMENTS

The author wishes to express his appreciation to the following men and companies for invaluable assistance in securing and allowing the use of necessary data used in the preparation of this paper: W. Byron Maxwell, The United Fuel Gas Company; J. W. Hendrickson, New York State Natural Gas Company; H. J. Magner, Delta Drilling Company; Dale Bonta, The California Company; D. M. Young, The Clinchfield Coal Corporation; Keta Gas and Oil Company.

—The End

About the Author

BYRON M. FINCH worked for ten years in the Production department of Ohio Oil Company, doing development, exploration and land work. During the next eight years he was with Pipe Line Construction and Drilling Company, serving as general superintendent of drilling and production, as assistant to the vice-president and general manager. At present he is engaged in oil and gas management consulting work.

Time is money to a drilling contractor. It is the variable which determines both his cost and profit. Further reductions in time required to drill a well can best be achieved by . . .

Closer Teamwork Between Contractor and Operator

By J. U. TEAGUE, President, Columbia Drilling Company, Houston

THE DRILLING CONTRACTOR has done his job well, as evidenced by the fact that he is able to drill at about the same price per foot today as he did in 1942. This has been accomplished in spite of rapidly mounting costs. To continue to offer his customer better service at the lowest possible price, he must explore every new idea or method which will reduce the time required to drill a well. Time is money to a contractor. It is the variable which determines both cost and profit. The attack on time can best be made by closer teamwork between the contractor and the operator. Several ideas which will promote closer co-operation between the contractor and the operator are:

- More complete information should be included in the bid proposal sent to the contractor.
- A standard drilling contract form should be adapted.
- Standardization of blowout-preventer requirements is desirable.
- The contractor should furnish a more accurate rig inventory, and the operator should be more diligent in seeing that bids are accepted only from rigs adequate for the job.
- The contractor and operator should cooperate in the designing of mud programs which will permit maximum drilling rates consistent with safe control of the well.

Statistics tell the story of the increasing importance of the drilling contractor to the oil-producing industry. He now drills 92 percent of all the wells drilled. Moreover, he is doing his work very efficiently. In the face of costs increasing by 94 percent since 1942, he has managed to drill without increasing his price per foot. This has been possible because he was able to reduce his drilling time by half. Whether or not this rate of progress can be continued depends upon a number of things. Some of which the drilling contractor can control, some he can't.

For example, the drilling contractor cannot do anything about the increase in operating costs brought about by the inflationary trend of the national economy. He can do something about practices by both contractors and operators which cause more time to be spent drilling a well than is absolutely necessary. The drilling contractor also can continue to search for technical improvements which will speed up the drilling rate and thereby reduce the time required to drill a well. In the past few years, this search has yielded the jet bit, oil-emulsion muds, the cantilever derrick, long drill-collar strings, and other improvements too numerous to mention.

Anything that can be done to reduce the time spent drilling a well will result in lower drilling costs. Cost is a direct function of time. Time determines the contractor's costs, and time determines his profit. One of the unique aspects of the drilling business is that the contractor prices his services on the unit of "foot of hole drilled," although this unit has no direct relation to his costs.

As an illustration, assume a contractor has an invitation to bid on drilling a well 10,000 feet deep. What does he do to arrive at the price per foot for which he is willing to drill the well? First, he estimates as nearly as possible how many days it will take to drill the well. The estimated number of days is multiplied by the average daily cost of operating the rig. The cost of transportation, bits, fuel, and water are added to this product to arrive at the probable cost of drilling the well. Then he adds his expected profit to this sum. The total sum is divided by the footage to be drilled to arrive at the price per foot which will be bid. You can see that time is the variable which determines his bid, not footage.

What steps can be taken toward reducing the time to drill a well, and who should take these steps, contractor or operator? The answer to this question is both. Closer teamwork between the operator and the contractor in the planning, drilling, and completion of a well offers the greatest opportunity for increased efficiency. They have always held each other in high regard. Historically their relationship has been one of complete confidence in the other's integrity. What other industry can point to the signing of so many contracts with so few legal disputes? In what other type of business, outside of the securities exchanges, do we find so much money spent and obligations assumed on a man's word? However, there are still areas in which we can help each other to do a better job.

Here are some ideas on how each can help the other.

Bid proposal. When a bid proposal is received by the contractor to drill

PROGNOSIS FOR DRILLING COCHRAN NO. 1 GARWOOD FIELD (SANDIES CREEK AREA) COLORADO COUNTY, TEXAS

OBJECTIVE:

Wilcox A-2 and A-4 Sands

PROCEDURE:

1. Cement 16" conductor pipe at 60'
2. Take deflections at 250' intervals from surface to T. D.
3. Use contract trailer lab on well while drilling from 60' to 6400'
4. Collect cutting samples at 30' intervals from 3000' to T. D.
5. Run Electric Survey No. 1 at 1750' prior to cementing surface casing. Sidewall sample if warranted.
6. Run Electric Survey No. 2 at 8550'. Sidewall sample if warranted. Pick coring point from Electric Survey No. 2 for top Wilcox sands and wireline core approx. 200' in upper Wilcox.
7. Drill stem test as warranted.
8. Run Electric Survey No. 3, Caliper Survey No. 1, and Micro Survey No. 1 (8500-8800') at T. D. 8800'. Run 24' lateral through Wilcox if necessary.
9. Cement casing through deepest productive zone using standard scratcher and centralizer program and complete.

MUD PROGRAM:

A 10.0-10.5# Caustic Quebracho mud should be adequate to T. D.

CASING PROGRAM:

16" Conductor at 60'
10¾" Surface at 1650'
5½" at 8800' feet as follows:
Surface-1200' 17# LTC J-55
1200-5500' 15.5# J-55
5500-6800' 17# J-55
6800-8800' 17# N-80

NOTE: This location is about 10 miles south of Rock Island and is accessible over dirt and gravel roads from that town. We understand gas for fuel is available from Well No. 1, located about 8000 ft. SW of the proposed drillsite at 15c/Mcf for a steam rig. The contractor lays line to the well and sets and installs the meter. We understand further that water for drilling purposes may be obtained by drilling a well to a depth of between 400 and 550 feet. A well was drilled about a mile and a half from the location last year to a depth of 10,300 ft., and should you desire to obtain details on the number of bits, or drilling time on this well, you may do so from either our division office or our district superintendent.

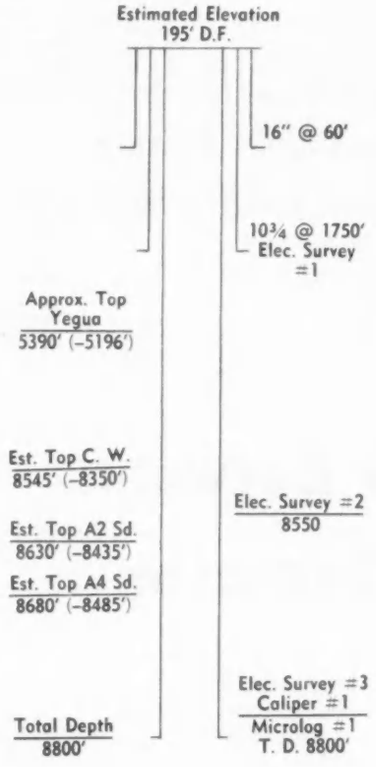


FIGURE 1

a well, a great deal of information must be assembled before an intelligent bid can be made. The most important of them are:

1. Depth the well is to be drilled under contract.

2. The estimated total depth of the well. This may or may not exceed the contract depth.

3. Proposed casing program.

4. The size hole required.

5. Mud program if the operator plans to specify this.

6. Road conditions.

7. Availability of water, and whether contractor or operator is to furnish.

8. Availability of fuel, and whether contractor or operator is to furnish.

9. The record of any wells previously drilled in the immediate vicinity. From these records, the number of bits and the time required to drill the well will be estimated.

10. The amount of so-called free time which the operator expects the contractor to furnish, such as logging time, cement time, and completion time.

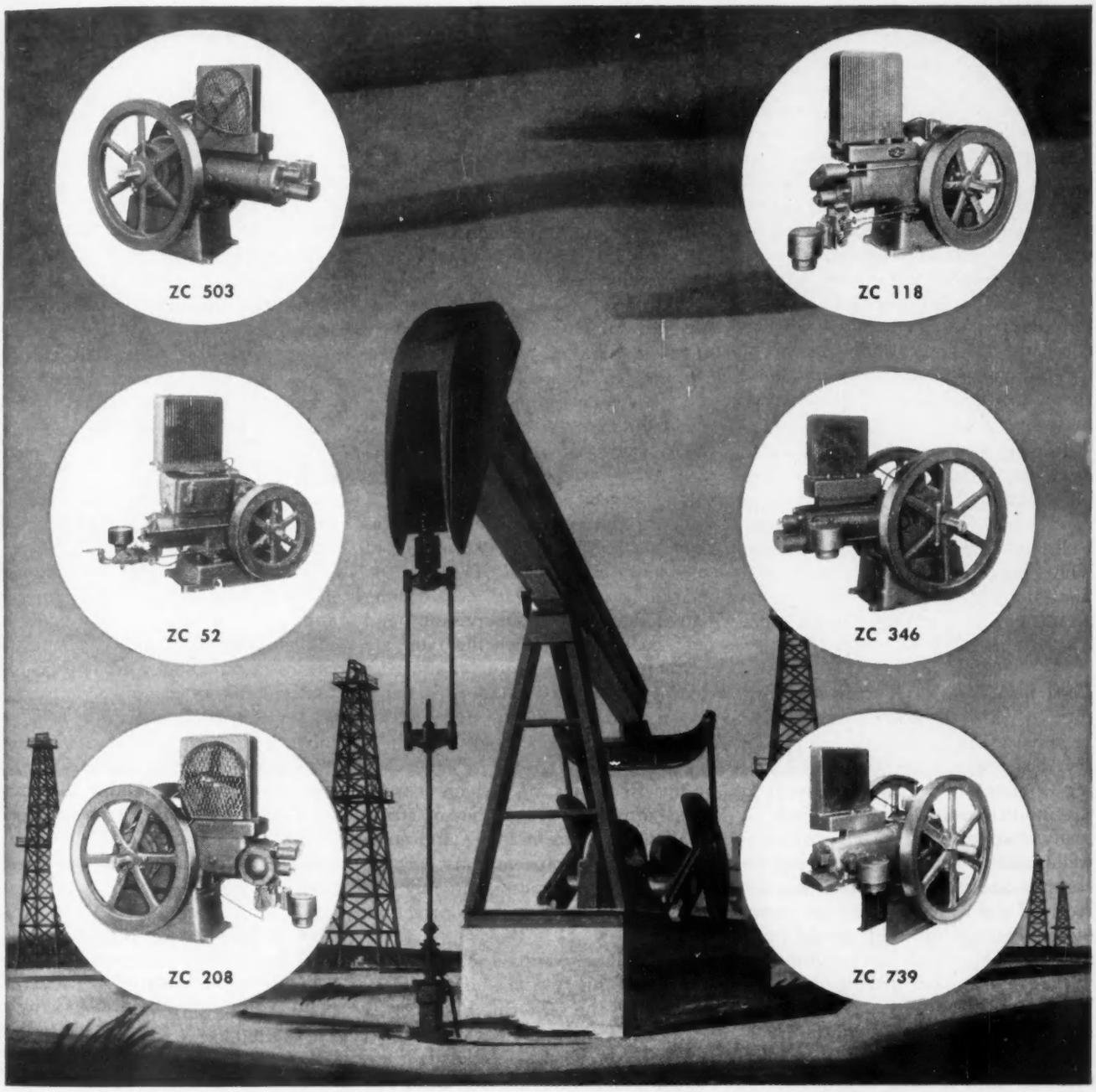
11. What protective clauses the drilling contract will contain, such as the "Gulf Coast clause," the "12.5-pound mud clause" common to most Gulf Coast contracts, and the "Chert clause" common to the contracts used in the West Texas and Rocky Mountain areas.

12. It is also helpful to know something of the coring, logging, and testing program planned for the well. This enables the contractor to estimate the amount of day work which will be involved.

This is a long list, but it is the minimum information the contractor must have before an intelligent bid can be made. The contractor must obtain this information from whatever sources available to him. If his sources of information are inaccurate, his bid will be inaccurate; or, if he is a prudent business man and he suspects the accuracy of his information, he will certainly add enough to his bid to take care of the unknowns. This often results in higher bids to the operator than conditions warrant.

Often the files of the operator contain all this information and a few minutes clerical time can be included with the bid proposal. If this practice were followed by more companies, it would perhaps result in generally lower bids, and avoid the wide variation between bids which are now experienced A company expects a contractor to make a fair profit on his work. A contractor is in business to make a profit. When bids vary widely, as they often do, someone doesn't know the score, for there just isn't that much difference in efficiency. In the interest of the lowest fair prices for drilling, it would be well for the company to furnish all the information available on the projected well with the bid proposal. Some companies are already doing this to a certain extent. A copy of a bid proposal from one company, which gives rather complete information, is shown as Figure 1. This company also submits a copy of their drilling contract form with the bid proposal, which is helpful.

In some instances a well will be drilled in an area where there have been no previous wells drilled, and a



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fair price cannot be determined accurately. In such cases, indiscriminate bidding may result in an unfair price to one or the other parties. These wells should be drilled on a negotiated basis. Any reputable contractor would be willing to renegotiate a contract on which he has grossly overestimated the cost of drilling, just as there have been many instances when a company has come to the rescue of a contractor who has under-estimated the cost of drilling in an unknown or hazardous area.

It costs money for a contractor to assemble the information to submit a bid on a well. Where a number of contractors are bidding on the same well the aggregate cost can be sizable. The operator pays this cost in the final analysis, because the only source of income the contractor has is from his customer.

Contracts. The need for a standard form of drilling contract has long been recognized as very desirable. The American Association of Oilwell Drilling Contractors has offered a form to the industry which was the result of many years of work by an eminently well-qualified committee. It is a good contract and a fair one, but it has not received the recognition or use it deserves. Perhaps the API should form a committee to study the possibility of writing a standard drilling contract. Their careful consideration of the American Association of Oilwell Drilling Contractor's form is recommended.

The drilling contracts used by companies today vary both in form and requirements. The form often varies between divisions within the same company. Wells have been drilled where a simple letter stating the depth the well was to be drilled, and the price to be paid per foot, constituted the contract. At the other extreme, wells have been drilled under contracts which must have taken a roomfull of lawyers to write, because that many words couldn't have come from one man—even a lawyer. Both are workable.

Perhaps that is because the contractor and the company representative to whom he is directly responsible recognize that the drilling of an oil well is a matter of teamwork. You can write contracts until you are blue in the face and there are still areas in which the contractor and company men must accept mutual responsibility. It is safe to assume that a drilling contract was never written which was not technically violated by both parties before the well was spudded in. However, because there must be some sort of legal understanding to fix responsibilities in a general way, there are several things that should be clarified in the interest of efficiency and standardized procedure.

The first thing is the need for a standard contract form, already mentioned. Then, there is the matter of so-called "free time." There is no such thing as "free time" on a drilling rig. Labor, fuel, supervision, and maintenance go on whether you are waiting for cement to set, running an electric log, or just waiting for someone in the head office to make up his mind. Yet, there are contracts which require time for one free electric log, or five free cores, or perhaps it is 96 hours after cementing the oil string to allow the cement to set and complete the well. Someone must pay for this time and, of course, the only one who can pay for it is the contractor's customer.

Several large companies have recognized that this is true and start daywork when the oil string of casing is cemented. These operators can expect, and will get, cheaper bids than the company requiring the free time. For example: Suppose a contractor has a well to drill for a company requiring 96 hours free time after cementing the oil string of casing. If the rig costs the contractor $800 per day to operate, he must add $3200 to cover this time, or 40 cents per foot when he makes his bid. If the well is dry and the oil string is not set, he is $3200 better off than if he had drilled a producer. On the other hand, the company who started day work when the oil string of casing was cemented would have gotten a 40-cent per foot cheaper bid to begin with and would have paid only for the time he actually used the rig. This is a better and fairer way.

Most drilling contracts fix a maximum deviation which the well can be permitted to drift from vertical. Such a clause is desirable from the operator's standpoint. If, however, the operator specifies a maximum of 2-degrees deviation when 10 degrees would not risk violating property lines or result in future difficulties in producing the well by artificial lift, then he will pay more for drilling his wells than need be. The prudent contractor will certainly take into consideration the latitude he has in deviation when he figures his price. If he is allowed a liberal deviation, he can in most instances reduce his drilling time by being able to maintain higher rate of penetration.

A well with a higher, but gradual, increase in deviation is safer to drill and probably easier to produce by artificial lift than one which has reversals in direction resulting from the contractor's efforts to keep the hole within the small deviation limits set forth in the contract. Some contracts allow a sliding scale of deviations with the allowable deviation increasing with depth. This sliding scale is perhaps the best solution, with the maximum deviation as generous as conditions will permit.

Mud program. The type of drilling mud used greatly influence the rate of penetration and, therefore, the time required to drill the well. In many cases companies specify the weight and character of the drilling fluid to be used. This is not objectionable inasmuch as companies pay for the chemicals and additives used in the drilling fluid, and rightly feel they should have a voice in what is used. However, many times the program adherred to by the company needlessly penalizes the contractor without materially adding to the safety of the operation. It is understood that in West Texas and "hard-rock" country, when the contractor changes from water as the drilling fluid to mud, his drilling rate is reduced greatly. In the coastal area, a switch to a "dry" or low-water-loss mud means reducing the rate of penetration in shales to a pronounced degree. The use of oil-emulsion muds where low-water-loss muds are required is most desirable from the contractors standpoint. If the

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contractor is permitted to use oil-emulsion mud, he can give you a better price because he knows he will be able to drill the well faster and with less risk from stuck pipe and tight hole.

Mud programs should be planned to permit the fastest drilling consistent with safety.

Blowout-preventer hook-up. It is desirable for the protection of both the contractor and the operator for adequate blowout preventers to be installed on the drilling well and maintained in tip-top working condition. However, there seems to be a race to see who can have the most complicated hookup without regard to what will provide reasonable protection.

One company will require two blowout preventers with one flow line; another will require three preventers with two flow lines under the same drilling conditions. Another company will require preventers with working pressures exceeding bursting strength of the casing to which they are attached. This works an undue hardship on the contractor as he must maintain an investment in this very expensive equipment far in excess of his average needs. No one would suggest the use of less blowout-preventer equipment than needed for maximum safety. But the maximum requirements should be fixed. It is understood that an API committee is working on this problem. An early conclusion is to be hoped for.

Selection of rigs. Every operator wants an adequate rig to drill his well in a safe and workmanlike manner. Most companies require that an inventory of the rig be submitted along with the bid. Who looks at these inventories and appraises them? Drive through the oil fields and you will see 7000-foot rigs drilling 8500-foot wells, and 8500-foot rigs drilling 10,000-foot wells. It is a bad and uneconomical practice to overload a drilling rig. It certainly costs the contractor, in the long run, costs the operator. If the rig is inadequate to do the job, it takes longer to drill the well; and the opportunity for hole trouble and mechanical failure is much greater.

Operators also have costs such as mud treatment and loss of production, which are a function of time. If you have much day work on a well, it usually occurs near the total depth of the well where the inadequate rig is under its most severe stress. The operator loses money through slow and inefficient performance.

Most of the chaos now existing in the drilling business could be eliminated if the contractors would be a little less optimistic with their inventories, and if the operators would be a little more selective in the choice of rigs for the drilling of a particular well.

It would be a good safeguard for both the contractor and the operator if the API and the AAODC would jointly work up a set of standards by which rigs could be classified. The rigs meeting these standards would have their inventories certified as to the depth range for which they are adequate. Operators could then buy with confidence if you only accepted bids from rigs which could furnish a certified inventory.

Contractor obligations. Much has been said about what operators could do to straighten and smooth the paths of the drilling contractor. But there are certain things the drilling contractor should do for himself and his customers. Perhaps sufficient importance is not attached to public relations.

Contractors often drill wildcat wells in areas where oil activity is not commonplace or well understood. In such areas, the contractor is looked upon by local people as the representative of the company which has employed him to drill the well. They will judge the contractor's customer by the contractor. They will see a lot more of the contractor's personnel than they will of company men. The contractor should be jealous of his employer's good name and conduct himself accordingly. If the customer is a major company, the conduct of the contractor crews may affect the sale of the company's products in that area. The contractor also has an obligation to the oil industry to be a good citizen and "sell" the industry to the public.

Drilling contractors are beginning to awaken to the responsibility of training and up-grading personnel. The AAODC is sponsoring a college of oil drilling for key personnel at Odessa, Texas. It is meeting with tremendous approval.

Contractors are conducting safety programs with gratifying results. Various Association committees have and are publishing accounting manuals, tax and insurance information, and technical manuals. They are good enough that operators are buying more of some of this material than are the contractors.

AAODC committees are working closely with their counterparts in the API and have interlocking memberships on many of the committees. In conjunction with the API, the contractors have developed a standard daily drilling report form which is meeting with wide acceptance. A manual has been published that is designed for use by the toolpusher on the rig. This manual required two years to complete. The drilling contractors have recognized that they should participate in research which will improve drilling technique. Until now, most of the improvements have been borrowed either from the customers or from the equipment manufacturers.

Recently the AAODC entered into a contract with Batelle Memorial Institute to explore the effect of viscosity of drilling fluids on the rate of penetration. Some $30,000 has been appropriated for this project. Additional work of this nature will be undertaken.

The drilling industry, although suffering from serious growing pains, is becoming aware of its responsibilities and obligations as an important member of the oil industry family and is trying to meet them.

ACKNOWLEDGMENT

This article taken from an address entitled "New Concepts in Drilling Contractor-Operator Relationships" and presented before the Southwestern District meeting of the API Division of Production, New Orleans, La., March 9-11, 1955. It is presented here in a slightly digested form.

—The End

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FIGURE 1—Emptying the core barrel Lincoln Drilling Company crewmen and core representative George Wood unload Aux Vases core on National Associated Petroleum Company's Sell 2 in White County, Illinois.

FIGURE 2—Breaking it up. National Associated Petroleum Company geologist S. R. Hollensbe and Jack Cross break up long sections of Aux Vases core on the White County well.

How to Get More Profit Out of Diamond Coring

Bottom-hole information is expensive and important. Make certain all the information comes up with the core barrel.

By B. G. HARMON,
DiKor Diamond Coring Service, Carmi, Ill.

CORING IS OF utmost importance to engineers, geologists, production men and management in determining reserves. And because of its highest recovery, low cost and best core appearance, operators are utilizing the diamond coring technique with increasing frequency.

Even though one foot of 3½-inch diameter core represents only .0000153 percent in 10 acre feet, it provides invaluable information in determining, not alone reserves, but unit participation factors, size of flooding equipment, water injection rates, formation lithology and continuity, possible productivity of previously abandoned holes, new and improved types of primary and secondary recovery, and better completion methods.

Diamond coring recovers practically 100 percent of all core cut. Core analysts declare that core information is only as good as the samples. When 25 samples are taken from each foot of a 25-foot core, the results are factual and not hypothetical. The high percentage of recovery is due to:

1. The inherent smooth abrasive action of the diamond core head as compared to the chipping action of conventional equipment.

TABLE 1

FORMATION	Bit Type	Applied Weight, Pounds	Rotary Speed RPM
SHALE	3	7—10,000	50—65
SHALEY SAND	2	8—12,000	50—80
Sands			
Soft	3	6— 9,000	60—80
Hard	2	10—14,000	60—70
Quartzitic	1	10—14,000	60—70
Limestones			
Siliceous	1a	10—16,000	54—70
Non-siliceous	1	8—12,000	55—75
Cherty	1a	12—18,000	45—70
Dolomitic	1	8—14,000	50—65

2. The short interval—approximately two inches in which diamond cut cores are subject to the washing action of circulating fluids, thus allowing soft formations to move up into the inner barrel before being washed away.

3. The bearing suspended, motionless inner barrel in which the core is stored before being brought to the surface.

The appearance of the core itself is a contributing factor to increased demands for diamond cores. When wiped clean of drilling fluid the diamond cut core presents a perfectly rounded, smooth sided formation specimen in which the thinnest shale laminations and the most minute styolitic planes can be easily seen.

This phenomena appears as an integral part of the core, showing the formation exactly as it exists, and not as planes where the core happened to break. The styolitic planes are of utmost importance in exploratory drilling where the slightest saturation is indicative of the actual presence of, or the nearby existence of an oil producing reservoir.

Diamond coring problems. Briefly, the general procedure to be followed in the use of diamond core equipment is: Approach the bottom of the hole with slow rotation and normal drilling volume of mud fluid; find bottom, pick up several inches and circulate 15 to 30 minutes; adjust mud pump to specified coring volume, and with minimum rotary speed (40-50 RPM) apply minimum weight (3000-5000 pounds) for first few feet; gradually increase speed and weight to point of highest rate of penetration for the particular zone being cored (See Table 1) and cut desired number of feet of core; break core off (being careful to apply slow but steady strain on core); pick up out of core hole, shut pump down and come out of hole in normal manner.

A more detailed discussion of some of the problems of diamond coring follows. The discussion is based on the writer's experience in diamond coring in the Illinois Basin, but is applicable to other areas where the diamond coring technique is being applied.

Core head damage. The constant use of junk baskets prior to coring, the

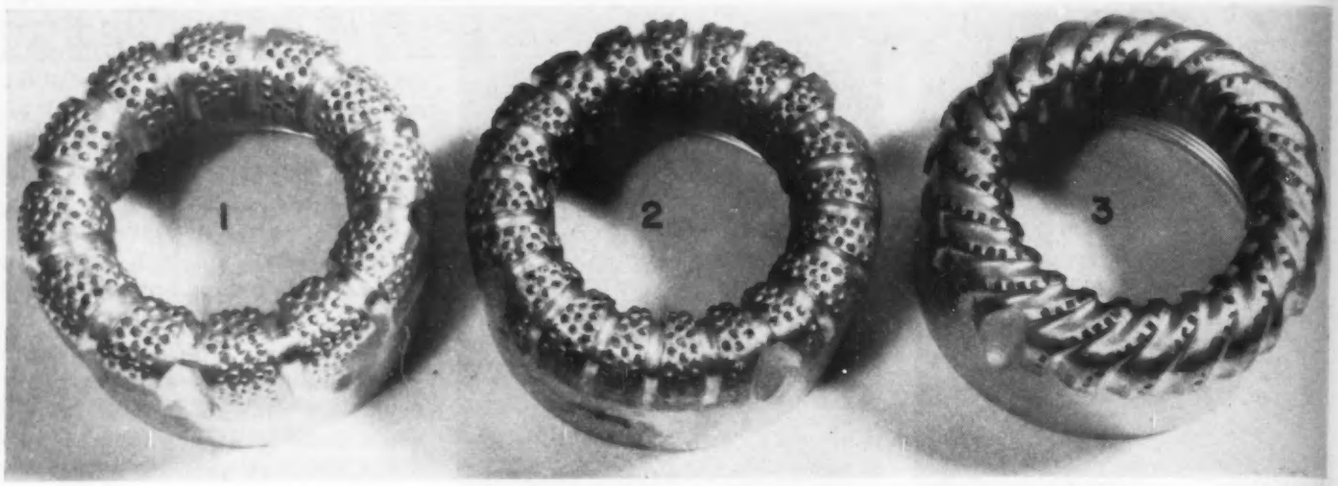


FIGURE 3
NEW CORE HEADS

1. Type 1—12, 5/16" water courses, 247.28 carats; also used: Type 1-a (nonprotruding diamonds).
2. Type 2—20, ¼" water courses, 260.00 carats; also used: 2a-20, 3/16" water courses; 2b-24, ⅛" water courses.
3. Type 3—24 water courses, 189.54 carats.

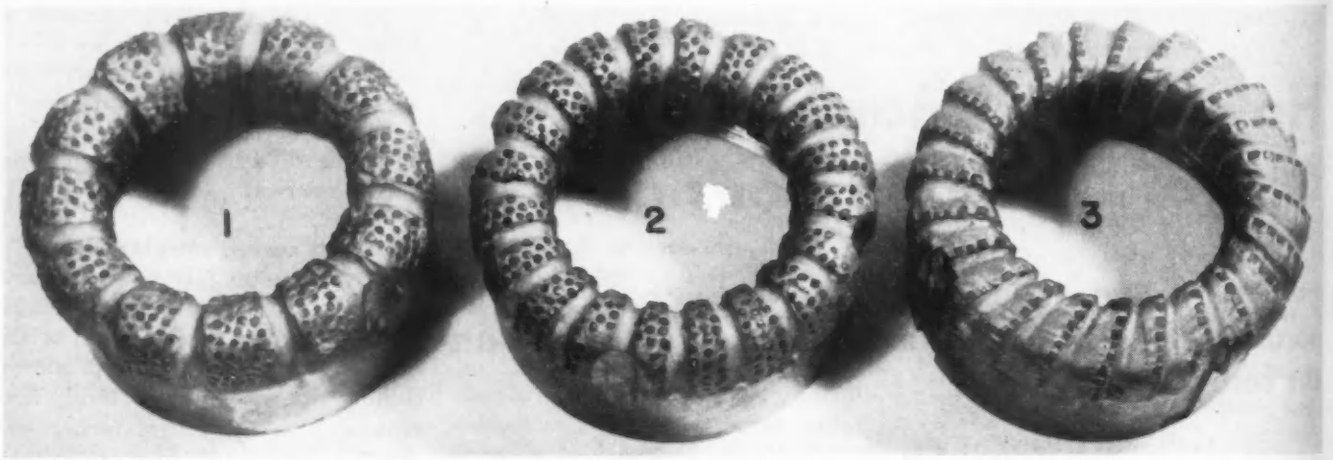


FIGURE 4
CORE HEADS IN USE

1. Type 1—12, 5/16" water courses, 261.43 carats and has cut 388 feet of core; also used: Type 1-a (nonprotruding diamonds).
2. Type 2—20, ¼" water courses, 261.43 carats and has cut 467 feet of core; also used: Type 2a-20, 3/16" water courses; Type 2b-24, ⅛" water courses.
3. Type 3—24 water courses, 179.00 carats and has cut 265 feet of core.

use of new drilling bits above the coring point, and due care to tong and slip dies will practically eliminate core head damage due to junk. Complete geological information of the stratigraphy will greatly reduce core head damage caused by chert, pyrite, and other troublesome formations. There are special core heads and coring techniques available for practically any type formation. Under certain specified conditions, most coring companies will assume full liability for bit damage.

In general, surface indications of failure of bottom hole equipment are:

1. Substantial (25 percent) and sustained increase in mud pressure.

2. Marked decrease in penetration rate.

3. Rough running of the rotary table.

Nonscheduled cores. These cores can be taken in zones carrying unexpected shows without the usual preparations and with little risk, if one condition is observed: MAKE NO CONNECTION.

The core barrel should be run in the normal manner and withdrawn from the hole when the desired number of feet are cored, or when the kelly is down.

Lost core. Because of the high core recovery, (one company in the Illinois Basin area averages 98.2 percent), this should present no problem to the diamond corer if he knows his business and observes the established and time-tested techniques employed in this operation. The loss of less than two percent of all core cut is a problem only when the attempt is made to reach the goal of zero loss.

Generally, lost cores can be attributed to one of three causes:

1. Cessation of coring in soft formation not capable of supporting weight of the core above it.

2. Undersize cores, which are usu-

ally caused by excessive rotary speed or crooked core barrel.

3. Wedged core.

Wedged core. The wedged core is probably the greatest problem of diamond coring. Experience in the Illinois Basin shows that for all the trips made in the hole with the core barrel, approximately 5.6 percent will have to be pulled because of wedged core.

Surface indications of wedged core are:

1. Variation in pump pressure.

2. Definite decrease of penetration rate with irregular "drilling off" of weight on bit.

3. Variation of torque applied to rotary table to maintain constant RPM.

Although these indications are generally present, wedged core can exist without any surface indication. This situation occurs when soft formation is being broken and ground up by firmly wedged core, core catcher, and core head at the same rate of penetration as the core was being cut. The loss of long sections of "good" sand is usually attributed to this cause.

The majority of wedged core is caused by:

1. Natural fractures and planes of weakness which break as they pass through core head and core catcher.

2. Cracks and fractures in softer formation created by the application of too much weight on the core head.

3. The existence in sand bodies, of shale laminations and thin shale streaks having weak bonding characteristics and showing pronounced dip.

4. Crooked inner barrels.

The steady and smooth application of weight on the diamond core head can do more to alleviate possible wedging than any other procedure. Also, additional time spent, in the first few feet, of using reduced weight and rotary speed to insure proper entrance of the core into the inner barrel, more than pays for the round trip saved because of weged core in the first few feet cut.

When a wedged core is suspected COME OUT OF THE HOLE. Attempts to "make it go" only result in damaged core heads, lost core, and wasted time.

Making connections. A large percent of all core head damage occurs when making connections. Although it is well to avoid connections wherever possible, there are certain precautions that can be taken to reduce the possibility of core head damage.

Most core heads are designed to allow small pieces of junk to pass through the break out plate slots and through the larger water courses. With this facility the core hole should be pumped vigorously until bottom is reached, rotary rocked slightly to dislodge any imbedded junk, and barrel picked up a few inches off bottom with pump running.

This operation should be repeated several times until slow rotation of the core head on bottom gives smooth and normal motion. Close measurements should be made so that there is no doubt as to actual bottom after connection is made.

Drill stem testing. This operation is generally successful, and in zones not overlain with thick bodies of "heaving" shale, very good success is obtained. The success of this operation lies primarily in the mud program. Since mud programs differ from well to well, it would not be practical in this brief article, to recommend a set procedure. This must be decided by the mud engineer or other personnel familiar with the hole and drilling conditions of the specific well where a drill stem test is to be taken in a diamond core hole.

The success of this operation is increased if the coring representative is notified in advance of the operator's plan to test, and can prepare for the test.

No harm to core or equipment will result if, after the barrel is picked up off bottom a few inches, normal circulating volume is maintained for 15 to 30 minutes in order to move cuttings and sloughed shale up the hole.

Laying down the core. In any diamond coring operation the laying down of the core is the climactic end of the operation. Too often this is handled in a haphazard manner. See Figure 1.

The core should be laid down in pieces as long as can be easily handled and in a consistent manner—bottom of the core always furthest from the floor. It should be laid down on a solid base reasonably well lighted to facilitate easy measuring, wiping and cleaning, describing and sampling of the core. If full core is not recovered, the inner barrel should be laid down and visually checked for any core which may remain in it.

Future prospects. Diamond coring has proved applicable to all types of drilling operations. Cores are being successfully cut on air and/or gas drilled wells. Many engineers feel that such a core more closely approaches the true reservoir characteristics than any other type of formation specimen.

Diamond cut cores on cable tools have been handled, generally, by backing some type of portable core drills onto the rig floor and employing normal rotary technique. The popularity of diamond cores has developed to the extent that equipment specifically designed for cutting diamond cores on cable tool rigs is now available in the cable tool areas of Illinois, Indiana, Kentucky, Ohio, West Virginia, and Pennsylvania.

The increased use of cores and core information points to an increase in the percent of diamond cores being taken as compared to the total footage being drilled. This is definitely the trend in the Illinois Basin. Besides the factors already mentioned which make diamond coring so important in ascer-

About the Author

BILL G. HARMON graduated from Purdue University with B.S. degree in mechanical engineering in 1948, after having served three years in the U. S. Army. He worked for The Superior Oil Company as engineer in the Illinois Basin and left that company to do consulting geological engineering for two years before forming DiKor Diamond Coring Service in December, 1952.

taining reserves and other data, another factor is the need (in the Illinois Basin area) for more cores in the Lower Mississippian, Devonian and Silurian limestones.

Cores of these formations, having revealed numerous zones which are thin, permeable, very often oil saturated, yet very difficult to evaluate from samples and electric logs, have resulted in profitable completions of what might have been considered dry holes, or marginal wells at the best. (Figure 2). This success need not necessarily be limited to conditions as found in the Illinois Basin. Undoubtedly, other formations in the stratigraphic columns of other oil provinces present similar problems which can be solved by the application of the diamond coring technique.

The majority of all diamond coring is being done by contract and the percentage is increasing. The reasons:

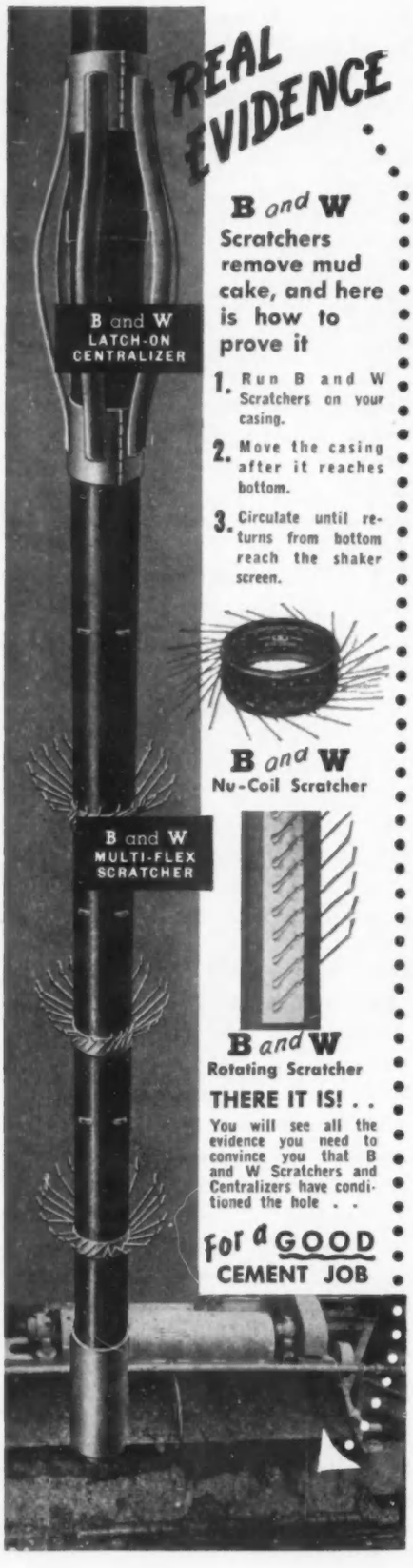
1. Diamond coring is a specialty job. To put a core barrel together and run it in the hole is no problem, but to anticipate bottom hole trouble and be able to correct it without loss of core or equipment takes much experience.

2. Contract coring companies have a wide selection of core heads to meet any type of formation, resulting in less time on bottom and better cores.

3. Companies doing only diamond coring give constant attention to core barrel maintenance. Bearing assemblies are torn down and overhauled periodically, stabilizers are kept built up to gauge, outer and inner barrel threads are checked on every job and rethreaded when necessary with the use of master gages, inner or outer barrels showing the slightest indication of being crooked are immediately sent to the shop and straightened, and the clearance between inner and outer barrels is checked and adjusted constantly.

4. Contract work offers a direct expense to the operator without bother of extensive bookkeeping. Furthermore, the operator has no capital tied up in specialty tools.

5. Active competition between contract companies keeps cost to a minimum and the search for better techniques at a high level. —**The End**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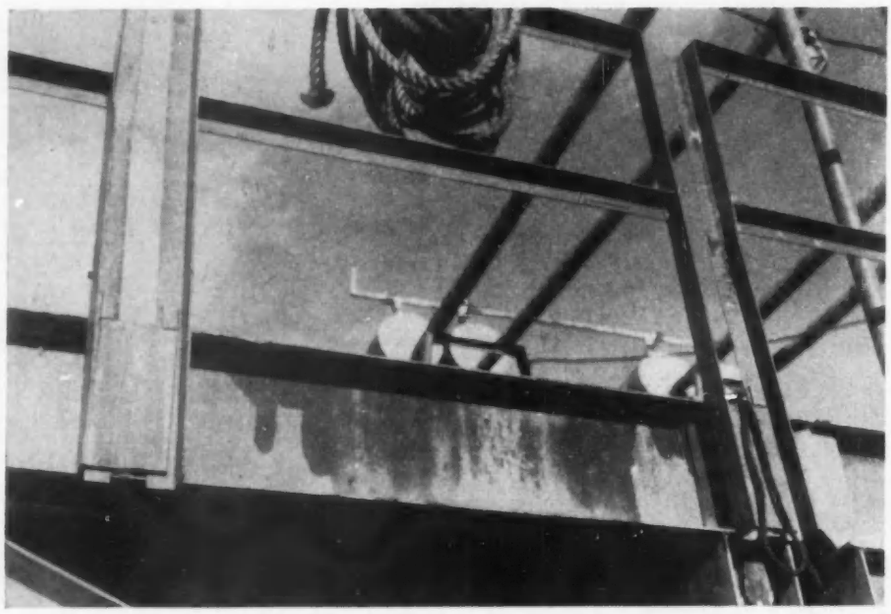


Unitized rail sections, identical in size and type of construction, which can be dropped into position or as easily removed, are being used by one drilling contractor. Constructed of 2-inch angle iron, with the open side of the angle facing outward, the two-rail sections drop into slots made by clips welded at regular intervals to the outer web of the I-beam floor member. Just the right amount of space is left between the edge of the I-beam flange and the clip to allow the rail leg to drop down into place. As shown, travel of the leg is limited by pieces of flat ¼-inch plate welded to the outer surfaces.

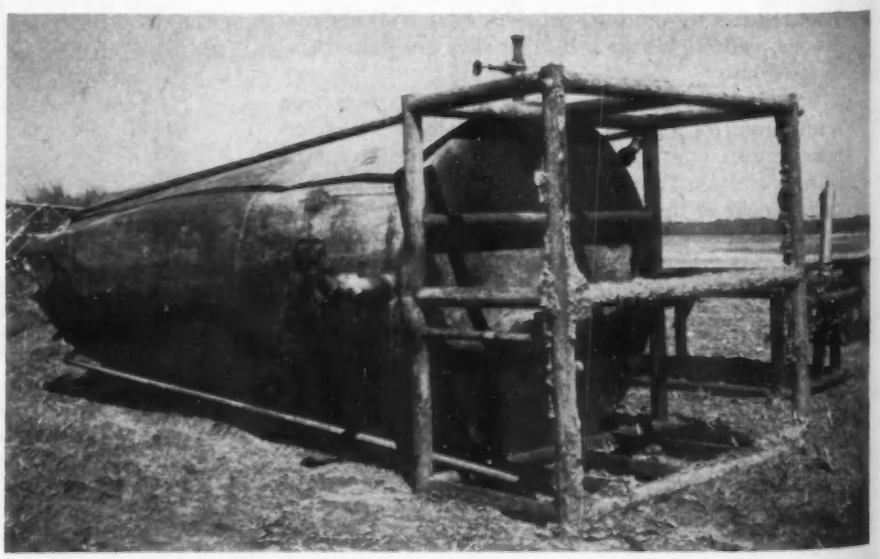
One or two men easily can lift out the rail section. The rails are simple in design and require a minimum of welding and handfitting of individual sections.

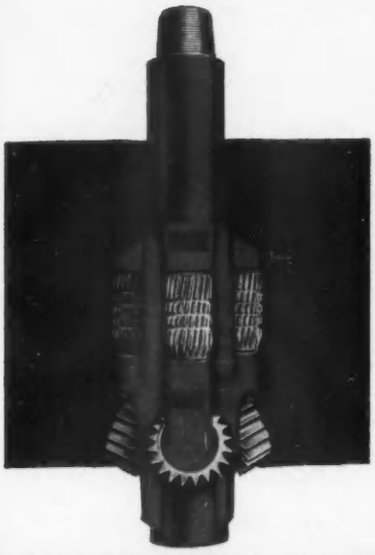
Support and Piping Built Onto Water Tank

Frank Woods Associates of Wichita Falls, Texas, have welded a pipe frame foundation onto the water tank to make rapid rig up possible. By spotting the tank and hooking up the inlet and outlet lines, the tank is ready for use.

A ladder, welded to the side of the tank, forms skids for easier loading and hauling.

A rectangular base support, made of 2½-inch pipe, supports the tank off the ground, permitting gravity feed to all parts of the rig. The inlet line is welded into the frame, and the connection at the top of the tank is welded to keep the pipe in place at all times. An overflow pipe on the opposite side of the tank carries excess or overflow water away from the rig.





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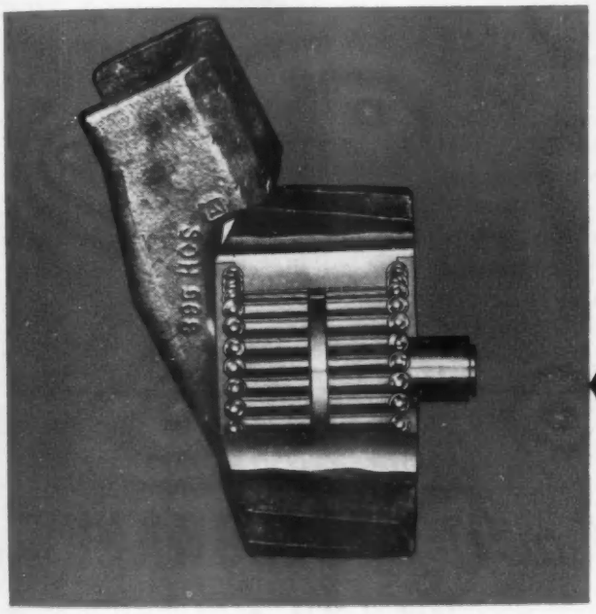

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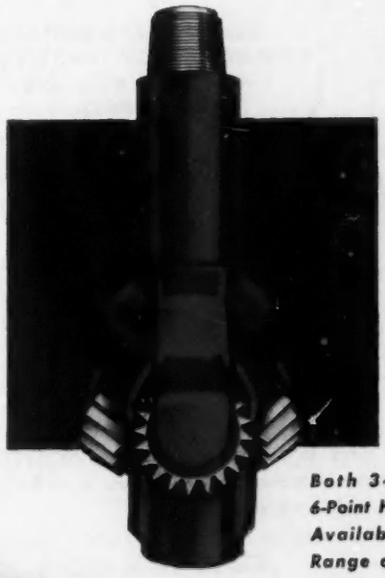

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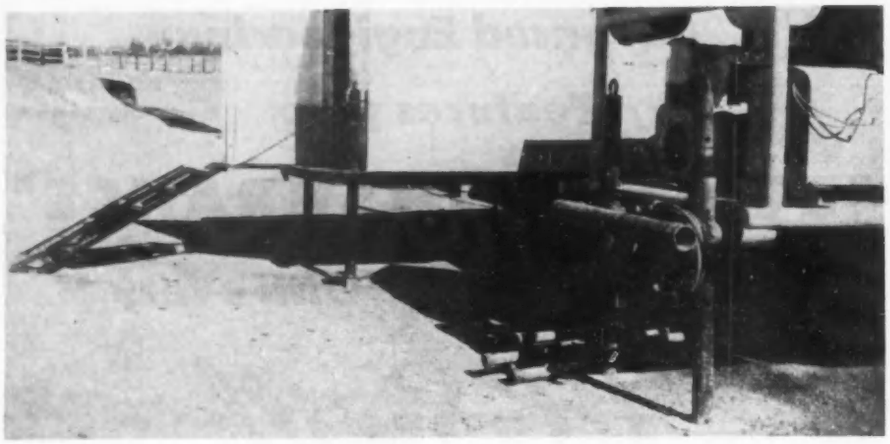
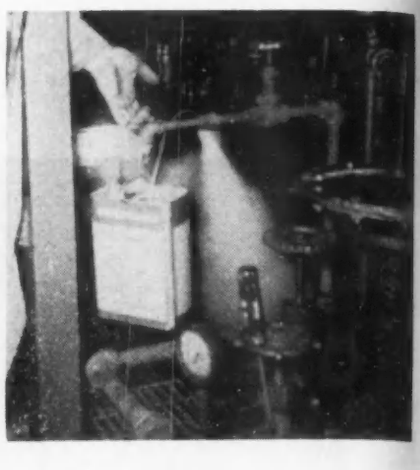


Adjustable Pipe Legs Used on the Doghouse

Musgrove Petroleum Company of Wichita, Kansas, used adjustable supports on the doghouse and auxiliary unit house so that the buildings can be adjusted to the height of the rig floor. The legs, made of drill pipe, slide inside a pipe welded to the frame at each corner. Pins fitted into matched holes burned in the support and legs adjust the height. Plates are welded to the ends of the legs to keep them from sinking in the ground.

When the rig is to be moved, the legs slide flush with the bottom of the skids to facilitate loading. When the buildings are erected on the edge of the derrick floor, the legs are set at proper height as the unit is unloaded.

The auxiliary building is serviced from the rig floor. The doghouse has stairs which hook onto an expanded steel walkway. The stairs are steep or inclined, depending on adjustment and extension of the legs.



Copper Coil on Steam Line Brews Coffee

One system for quickly heating water for coffee was devised by the fireman on a Texas steam rig. The heating unit consists of a piece of coiled copper tubing connected to the steam line as shown.

The water is brought to a boil in a few seconds by inserting the copper coil into the water and turning on the steam.

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Edmonton, Alberta

Wire Rope at Work—The intrepid derrickman whizzing through space in the picture above was photographed while demonstrating the safety slide. This device makes possible rapid escape from the mast in case of a blowout or other hazard. The rig shown here, which is owned by the J. W. McCutchen Drilling Company, Wichita Falls, was working at the time in Coke County, Texas.

The safety line consisted of Bethlehem 6x7 wire rope with a bethanized coating to guard against corrosion. Less spectacular in its application, but with far heavier duties, was the 6 x 19 Bethlehem rotary line, which of course saw active service hour after hour, day after day. Though installed for widely different purposes, both ropes were chosen for their known ability to do the work assigned to them, and do it well.

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Portable Mud Testing Lab Attached to Rig

A shop-made, quickly-installed, portable mud testing laboratory, built to withstand roughest service and handling on the rig and between moves, is being used successfully by a Canadian operator. The unit is of all-welded construction, the sheet steel back and bench surface being welded to a rigid framework of 2-inch pipe.

The small laboratory is equipped with a recessed rectangular sink, water outlets in the back panel and an enclosed box for storing mud balance, hydrometers and similar test equipment. Handles welded to the top of the back support the unit on angle iron brackets attached to the side of the rig.

Water is supplied to the laboratory by a rubber hose attached on the back side of the panel. The sink drain, installed over the mud ditch, permits waste mud and water to be disposed of easily without mess or bother. A weather-proof lamp is suspended from the side of the rig floor enclosure to provide light for night work.

Representing little in materials cost or construction time, the unit easily is lifted by two men and hung on the two hooks, and is easily stored when moving between locations.

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The condition of mud in the hole is recorded automatically during every minute of the drilling operations. Weight variations of less than 1/10-pound per gallon can be detected. Mud-O-Graf has been proved in fourteen years tough field service. It eliminates trial and error methods of adding weighting materials. It detects gas or salt water incursions which could cause blowouts.

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Floor, Substructure Moved in One Load

Turner West Drilling Company of Graham, Texas, has assembled the floor and substructure of their portable rig so that it can be carried by truck and set down exactly over the location stake. This method can only be used to move the rig over lease roads or for short distances over public roads.

The truck is backed under the load and the load winched on, with the winch line using drill pipe across the bed of the truck for rollers and support. The load is not completely loaded so that there is still strain on the winch line in transit. When it is spotted, the winch line can be slacked off, the back end set down and the truck driven out from under the load. The substructure can be skidded into position over location by winching.

Good Installation Design Vital In Gas Lifting Dual Zone Wells

• The producing problems of each well must be considered individually to properly select the type of gas lift equipment which will do the best job.

• Here is a discussion of the many factors involved.

By **H. W. WINKLER,**
Camco, Incorporated, Houston

GAS LIFT INSTALLATION design for producing only one zone is relatively simple. However, design becomes complex when both zones in a dually completed well cease to flow. No one type of gas lift installation will meet the producing requirements of every dual well to be artificially lifted. The producing problems of each well must be considered individually, along with the type of gas lift equipment which will best fit existing conditions. The latter requires knowledge of the limitations of various combinations of gas lift installations.

The casing size limits the combination of tubing sizes which can be employed. If simultaneous artificial lifting of both zones of a dual well is anticipated prior to drilling, 7-inch outside diameter casing should be the minimum size considered in the drilling program. Larger casing will permit a greater number of gas lift equipment combinations to meet producing requirements.

The flow valves selected must be capable of producing the required fluid with a reasonable injected gas-fluid ratio. Choke or orifice sizes must be evaluated for small tubing. A combination of fluid weight and pressure operated valves generally are required for satisfactory operation when using a common injection gas source.

Since flowing gradients in small tubing and restricted annular areas are high, low capacities and high injection gas pressures should be anticipated.

If future running of a macaroni string inside the tubing is anticipated, at least 2½-inch or 3-inch tubing should be run in the well initially.

The concentric string type installation costs less than the parallel type. In addition, the flow valves on the concentric macaroni can be replaced economically. The parallel string installation usually permits a larger producing capacity than the concentric type, but presents a more hazardous running and pulling operations. Many types of parallel string installations offer the advantages of full open tubing.

Complete control of the injection gas is assured from separate injection gas sources for each zone to be lifted. Although lifting two zones with a common injection source represents less initial investment, the cost of a workover resulting from one zone starving the injection gas from the other will generally offset this saving over separate injection gas sources.

The present trend in dual gas lift equipment is toward wire line retrievable flow valves. Retrievale equipment permits the replacement of a valve for only a fraction of the costs of round-tripping the tubing strings.

GAS LIFT FLOW VALVES

Pressure-operated valves are the most widely used flow valves. These valves can have a pressure charge, a spring force, or a combination of the spring and pressure load holding the valve closed. The majority of these valves have a bellows which opens and closes the valve by a set pressure fluctuation opposite this bellows. The pressure opposite the bellows in generally the injection gas pressure, and by increasing or decreasing this injection pressure, the valve can be opened or closed from the surface.

A constant flow valve is a one designed for metering the gas through a fixed orifice into the fluid column. These valves have a large port to utilize maximum back pressure effect from the tubing. A pressure operated valve with an unrestricted port is used for intermittent operations, which is sometimes termed "slug lift."

Fluid-operated valves are opened and closed by an increase or decrease in fluid head in the eductor tube. This is a pressure operated valve that is run in a special mandrel which enables the fluid weight in the eductor tube to provide the opening force opposite the bellows.

Differential valves are operated automatically by changes in the fluid head in the tubing. The differential between the casing pressure and the fluid weight necessary to open the valve is controlled by a spring incorporated in the valve.

The valves will remain closed until the fluid weight plus the spring force becomes greater than the casing pressure, at which time it will open. Gas injection continues into the fluid column until the fluid weight decreases, as a result of aeration, below that pressure necessary to hold the valve open.

Flow valve selection. When a common injection gas source is used to lift both zones of a dual completion, pressure-operated valves frequently are used in combinations with dif-

ferential or pressure-charged fluid-operated valves. This combination is desirable because two strings of pressure-operated valves often will result in one zone using all the injected gas. Significant fluid weight effect can be achieved by running large ported, unbalanced flow valves.

An intermitting valve with a ratio of 16 percent between the area of the port and the effective area of the bellows has an approximate 20 percent back pressure effect on the seat area. In other words, a 500-pound-per-square-inch fluid build up above the valve will decrease the opening pressure of this valve by 100 psi. The tubing back pressure effect on a valve is an important consideration in the design of a dual well, where both zones are being lifted from the same injection gas source.

LIMITATIONS OF SMALL TUBING AND RESTRICTED ANNULAR AREAS

Capacity. Small tubing sizes and small annular areas between the macaroni and conventional tubing string result in high flowing gradients. According to Fanning's equation, the capacity of two different sizes of tubing for single phase fluid flow is a function of the ratio of the tubing diameters to the 2.5 power. A rate of 250 barrels per day through 1¼-inch tubing would be equivalent to approximately 1000 barrels per day through 2-inch tubing. The multiphase vertical flow of an actual gas lift well is a more complex problem. An outstanding contribution for calculating the conditions encountered in this type of flow is offered in the API paper, No. 851-25-1, by Poettmann and Carpenter. This paper, published in API Drilling and Production Practices, 1952, presents a pressure gradient traverse correlation for 2, 2½, and 3-inch tubing sizes, based on field data compiled from flowing and gas lift wells.

An extrapolation of pressure traverses for 1¼-inch tubing, employing the method outlined in the API paper, revealed the flowing gradients to be extremely high. The resulting gradients indicate that a high injection pressure is necessary for nominal depths. If the operator desired 250 barrels of fluid per day from a low fluid level well through 1¼-inch tubing from a gas injection depth of 5000

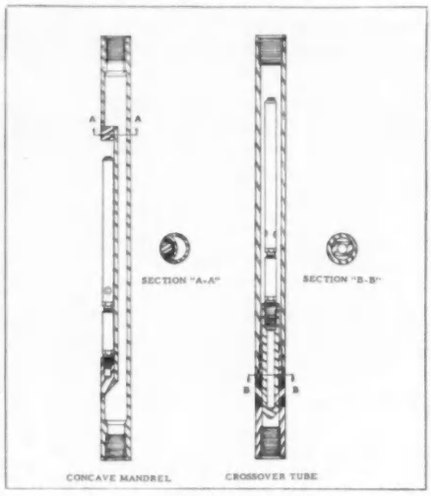


FIGURE 1

feet, a surface injection pressure in excess of 1000 psi should be anticipated. The flowing gradient in small tubing, as compared to that in 2 or 2½-inch tubing, becomes excessive for relatively low continuous producing rates and a reasonable surface injection pressure.

Annular flow results in considerable turbulence from the small tubing couplings and mandrels; therefore, an efficient intermitting installation through a small annular area is doubtful. By the use of large tubing and small macaroni strings, high rates of fluid production are possible by continuous flow through the tubing annulus from high productivity, high bottom-hole pressure wells.

Setting depths. To run the desired size macaroni in a tubing string already in the well will often require a non-upset tubing. Small non-upset tubing strings are limited in the depth to which they can be run because of the weakness in the threaded section of the coupling. Should a packer be necessary on the macaroni string for efficient gas lift operation, a safety factor in tension must be considered for pulling this packer. This further reduces the already short setting depth of a non-upset string.

Deposition problems. Paraffin or scale deposition must be considered. Experience indicates that annular flow is not desirable for fluids which deposit paraffin, carbonates, or sulfates. The pulling of the macaroni can become difficult, if not impossible, as a result of this condition. This deposition can generally be reduced or eliminated by the proper chemical injection into the lift gas.

Problems of flow valve selection. The decrease in the opening pressures of pressure operated valves with depth should be as great as possible. The high resistance to flow in a small annular area or macaroni string may cause the upper valves to open before the pressure can be transmitted to the desired operating valve. If the available kickoff injection pressure is low, making a significant decrease in valve setting pressures impossible, a choke installed downstream of the surface intermitter is desirable to prevent opening of the upper valves.

Selection of the proper flow valve port or choke size is most important for gas lifting through a small macaroni or annular area. It can be extremely critical if the injected gas supply is in a large casing annulus. Fluid operated or intermitting valves should generally be choked to prevent excessive gas passage. The increase in flowing gradient from excessive injection gas imposes a back pressure in the small eductor tube which will reduce the fluid production. Differential valves with orifice equivalents varying from a 3/64-inch to a maximum of 6/64-inch have been used with 1¼-inch and 1½-inch tubing sizes for 3000-foot wells. Fluid operated valves with choke sizes from 4/64 to 8/64-inch have been run on 1¼-inch tubing strings to depths in excess of 6500 feet. Ample gas passage has been experienced with these orifice or choke sizes. When a small annular area or macaroni string supplies the injection gas to the valves ¼-inch ported valves have proven satisfactory.

GAS LIFTING ONE ZONE OF A DUAL

Both concentric and parallel string types of installations are used in lifting one zone in a dually completed well.

Concentric strings. A small macaroni string inside of 2, 2½, or 3-inch upset tubing for gas lifting through the tubing represents the majority of dual gas lift installations. Flow valve mandrels which are commonly used with macaroni strings are shown in Figure 1. Oil or gas can be flowing from the casing annulus. This type

of installation offers the following advantages:

- Low initial installation cost because the valves can be run without disturbing the existing equipment in the well.
- Valves can be economically replaced, for the same reason.
- It is unnecessary to kill the flowing zone, thus reducing the hazard of possible damage when working over the zone on gas lift.

In the case of a dual in which high pressure gas is being produced from the casing annulus a gas lift installation permits artificial lift without vibration.

Figure 2 illustrates two concentric-type installations. The disadvantages of a concentric-type installation are the same as those outlined in the small tubing section of this paper. If the operator anticipates future gas lifting of the zone producing through the tubing, these dis-advantages can be partially offset by running at least 2½ or 3-inch tubing in the well initially.

The concentric installation can be modified to permit the flow of a weak zone through the small tubing. Selection of conventional or casing flow mandrels for the larger tubing string will enable the operator to use the casing or the small tubing annulus for gas lifting the second zone. The disadvantages to this installation are:

- The valves must be run initially with the larger tubing string.
- Both strings of tubing must be pulled to replace a flow valve.
- Both zones must be killed for installation and workovers.

These disadvantages can be offset partially by running eccentric retrievable valve mandrels on the tubing string, thus permitting the replacing of flow valves by wire line, after pulling the macaroni.

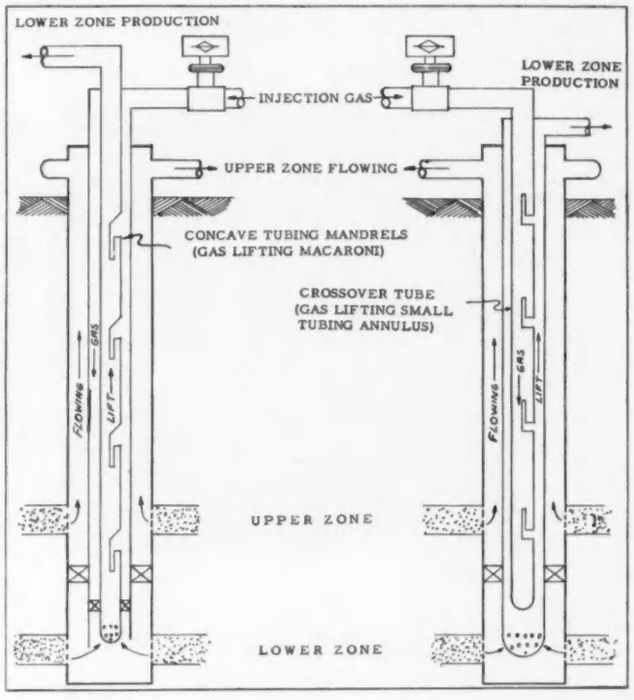


FIGURE 2—Gas lifting one zone of a dually-completed well concentric-type installation. (Note: By utilizing crossover equipment, upper zone could be lifted.)

Parallel strings. A two-parallel string installation differs from a concentric-type in that two tubing strings are run, side by side. These strings may be either strapped together, or supported separately. When only one zone is to be gas lifted the installation can be designed to permit the workover of that zone without disturbing the flowing zone. This can be accomplished by the use of a special detachable dual string packer which permits the running of each tubing string separately.

The two parallel strings offer additional capacity over most concentric-type installations. In large casing all the advantages of full open tubing are possible which permits paraffin cutting, the running of bottom hole pressure surveys, etc. The tubing centerlines can be kept strictly parallel through the mastergate valves by installing the dual tubing wellhead equipment now being manufactured for this purpose.

Two parallel string installations can be designed for the three following combinations of flow and lift:

- Producing both zones through the tubing strings by gas lifting one string with gas from the casing annulus. This is the most "universal" parallel string installation for gas lifting only one zone.
- Injecting gas in one tubing string to gas lift the casing annulus while flowing through the second string. If the high productivity zone to be lifted is the upper zone, the subsurface equipment cost will be greatly reduced by the elimination of a packer and crossover equipment.
- Injecting gas in one tubing string for gas lifting the second string. This installation is especially suited to an oil-gas dual where the upper zone is gas. If the casing has a sufficient inside diameter to utilize special retrievable equipment, flow valves can be replaced without disturbing the gas zone.

The disadvantages of the parallel strings over the concentric strings for gas lifting one zone are:

- The higher initial cost.
- The necessity, in many types of these installation, of killing both zones and pulling both strings of tubing to replace valves.
- The greater possibility of a "fishing" job during a workover.

GAS LIFTING TWO ZONES WITH A COMMON INJECTION GAS SOURCE

The advantage of utilizing a common gas source for lifting two zones is the low initial installation cost.

Design consideration. The flow valve design is critical for a common injection gas source because of the problem of one zone starving the other for gas. Partial rectification can be accomplished by the use of a time cycle surface controller on the flow line of the zone using most of the gas. The surface controller can be set to shut in the flow line of this zone several hours per day, thus allowing

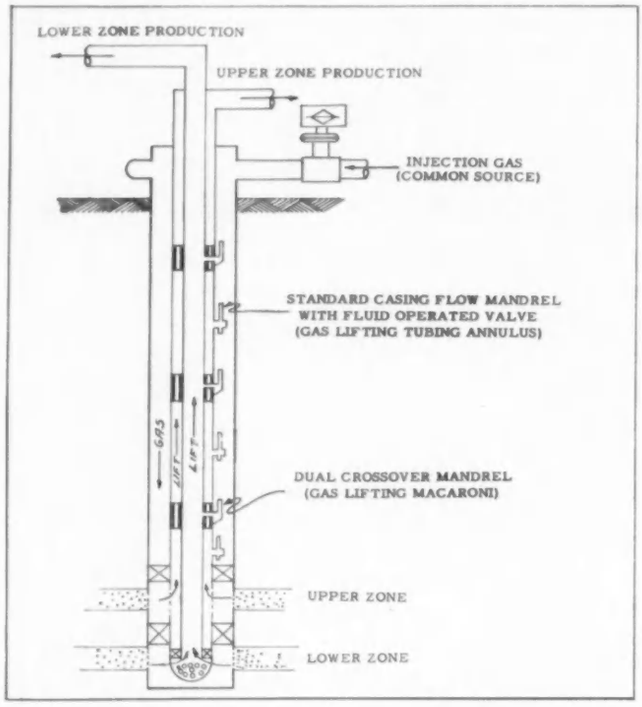


FIGURE 3—Gas lifting both zones of a dually-completed well concentric-type installation with common injection gas source.

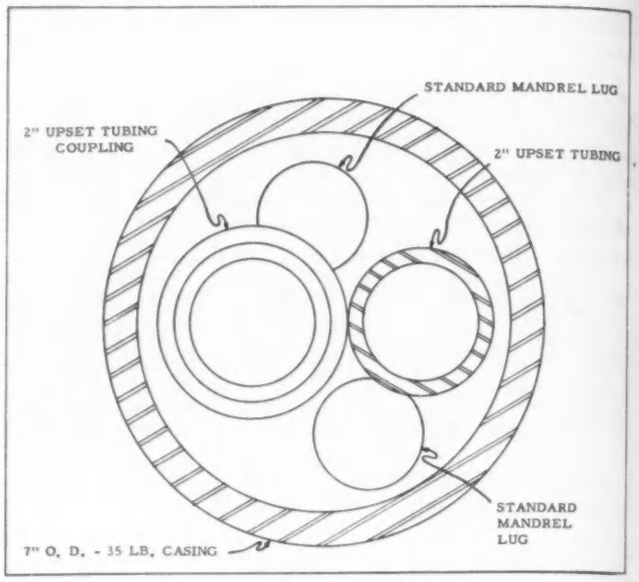


FIGURE 4—Two parallel strings of 2-inch EUE tubing with conventional valve mandrels in 7-inch O.D., 35-pound casing.

the starved zone to receive all injection gas during this period.

Concentric strings. The concentric-type installation in Figure 3 generally can be installed for less initial cost than the parallel string type and is readily adaptable to small casing sizes. If the casing annulus is used for injection gas for an intermittent type installation, high injection gas fluid ratios are probable. Because of the spread, (which is the difference between the opening and closing pressure of conventional pressure operated flow valves), the cubic feet of gas passage per valve operation increases with pressure, casing size, and operating valve depth.

The problems of intermittent design for small tubing in large casing are extremely difficult. The capacity of small tubing is not sufficient to provide the fluid slug necessary for a low gas-fluid ratio. Large valve ports permit excessive gas passage and are prohibitive to efficient gas lift operation. A small port or choked valve will remain open many minutes or possibly hours. The valve will not close before the necessary volume of gas passes through the small port opening to reduce the casing pressure to the closing pressure of the valve.

These are extremely important considerations in the design of a small tubing and macaroni installation that is to be run in large size casing. Continuous flow design generally will give optimum performance in this type of installation. High rates of fluid production are difficult to obtain from a concentric-type installation even though the gas is injected down the annulus between the macaroni and tubing. This annular area may be insufficient to permit adequate gas passage. If the well is a part of a closed rotative system which requires gas storage, the small annular area is detrimental to the system.

For wells which can be casing flowed, the gas lift installation can be designed to permit removal of both strings of flow valves without pulling the tubing. By running eccentric-type casing flow retrievable valve mandrels, the casing flow valves can be retrieved selectively and replaced by wire line methods after the macaroni string has been pulled. This installation is extremely flexible in comparison with other types of installations using a common injection gas source.

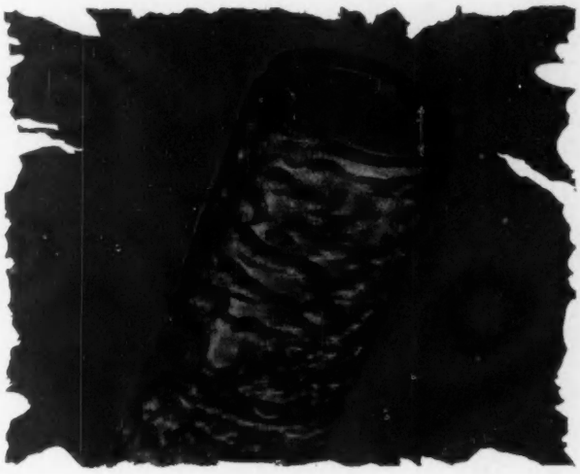
Parallel strings. Two full open 2-inch tubing strings with conventional pressure-operated valves can be integrally run in 7-inch OD casing, (Figure 4). The casing annulus will hold an adequate gas supply for the lifting of substantial rates of fluid from both zones. The higher initial cost of parallel strings over concentric strings and the hazardous round trip operation discourages many operators from running parallel strings. By a minor modification of an additional string, parallel or concentric, the operator is assured of controlled injection gas for the lifting of both zones. Retrievable equipment is available which permits the gas lifting of two zones by a common gas source with all valves selectively retrievable. Combinations of 1¼-inch line pipe strapped to 2-inch tubing are available for 5½-inch OD casing.

GAS LIFTING TWO ZONES WITH SEPARATE INJECTION GAS SOURCES

Design consideration. The three string installation is the gas lift engineer's choice for lifting two zones. The important advantage is that each zone has its separate injection gas supply. None of the disadvantages of the common injection gas source for lifting both zones are experienced in this type of installation. The flow valve design is as simple as that for a conventional single completion gas lift well with the exception that two strings must be considered. Both

This is trouble...

This unretouched photo shows a plunger section taken from a pump operating in a Mid-Continent oil field. The extreme pitting indicates what corrosive and abrasive action can do to a pump part when it is not metallurgically suited to the well condition. A wrong specification of parts for the specific well condition might be the cause of failure.



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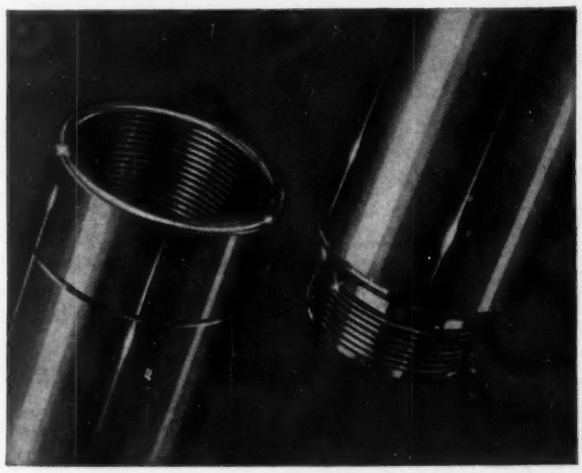

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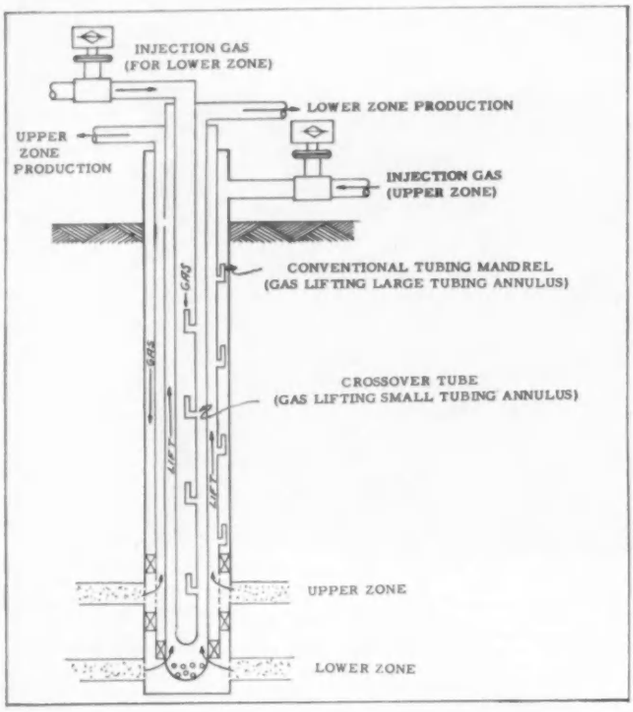


FIGURE 5—Gas lifting both zones of a dually-completed well completely concentric-type installation with separate injection gas sources.

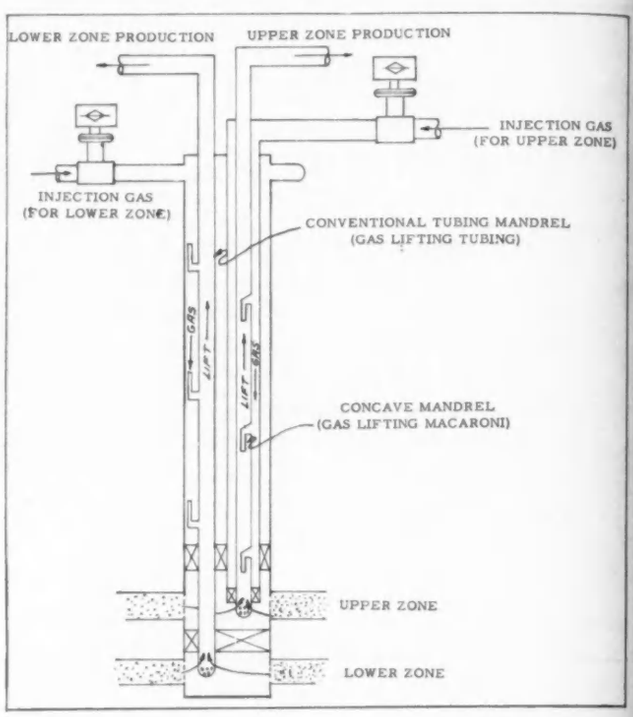


FIGURE 6—Gas lifting two zones of a dually-completed well combination-concentric and parallel-type installation with separate injection gas sources.

strings can be the intermitting type without encountering the problem of one zone taking most of the gas. Each zone can be operated and tested completely independently of the other zone.

The three strings can be any of a number of combinations of tubing sizes and can be completely concentric, combination of concentric and parallel, or completely parallel. The concentric strings offer greater flexibility in the case of a malfunction, because the macaroni or inside tubing can be pulled without removing the larger tubing. For this reason, the troublesome zone should be lifted by flow valves on an inside string. If all the strings are parallel, the complete installation must be pulled to replace one valve. However, higher producing rates may be obtained from the parallel strings than from the concentric strings.

The disadvantages of the three-string installation are:

- It has a high initial cost.
- It is complicated to run and pull.
- It presents more of a problem in the event of a fishing job.
- It requires a large casing size for certain desired tubing combinations.

In wells which will permit normal wire line operations, the workover costs can be kept at a minimum by the use of completely wire line retrievable flow valves.

Three string installations—Concentric. A completely concentric three string dual installation is prohibitive in small casing. It is necessary to use non-upset or flush joint tubing to obtain sufficient equivalent areas for satisfactory operation. An example of this type of installation would be a 1-inch macaroni inside 2½-inch non-upset tubing inside 4-inch non-upset tubing run in 7-inch OD 23-pound casing (Figure 5).

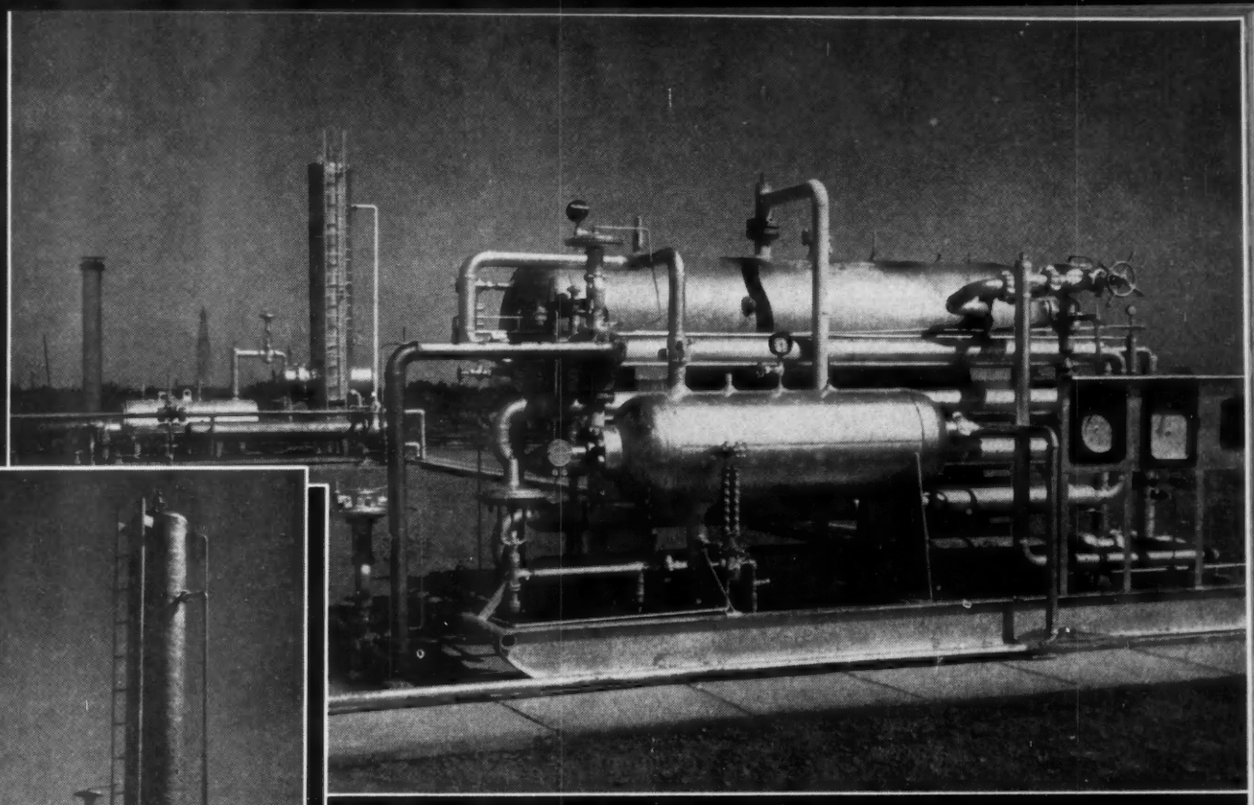
Injection gas in the casing and inside or outside of the macaroni would be two of several variations of the concentric three-string installations. This type of installation is seldom considered because of the special packers and uncommon tubing sizes which are generally required.

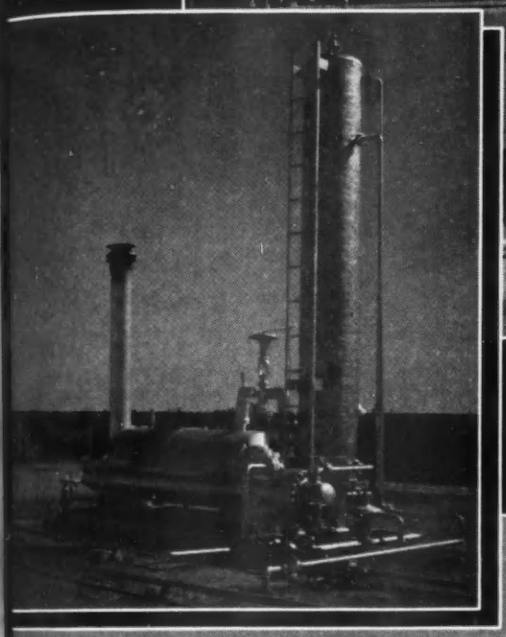
Three-string installations — combination of parallel and concentric. The operator can select one of four different designs for dually lifting two zones with a combination of parallel and concentric strings. The tubing sizes can be varied in each type of installation to increase the lifting efficiency and assure the required production. Injection gas in the casing and the tubing annulus or macaroni are the two types which will adapt to the majority of dual wells.

Figure 6 illustrates injection gas in the casing and tubing annulus. By injecting gas in one tubing string, two additional combinations are possible. Utilizing a concentric macaroni string permits flow valve replacement at a low workover cost. Many combination parallel and concentric type installations are now in operation in West Texas.

Three-string installations—parallel. A three-parallel string installation with non-retrievable-type flow valves can be designed to meet the producing characteristics of the zone to be lifted. Some examples are as follows:

- Injecting gas in the casing and small tubing to lift the two tubing strings. An example of this type of installation, Figure 7, would be two 2-inch tubing strings and a smaller tubing string attached to special capsule by-pass mandrels. The smaller string supplies gas for the valves inside the special mandrels for gas lifting one string of 2-inch tubing. Conventional or concave mandrels with flow valves would





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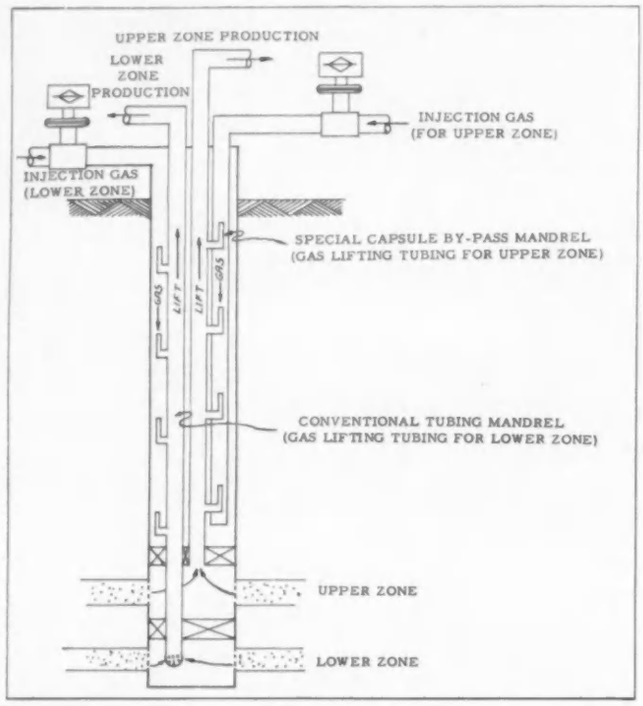

UPPER ZONE PRODUCTION
LOWER ZONE PRODUCTION
INJECTION GAS (FOR UPPER ZONE)
INJECTION GAS (LOWER ZONE)
SPECIAL CAPSULE BY-PASS MANDREL (GAS LIFTING TUBING FOR UPPER ZONE)
GAS LIFT
GAS LIFT
CONVENTIONAL TUBING MANDREL (GAS LIFTING TUBING FOR LOWER ZONE)
UPPER ZONE
LOWER ZONE

FIGURE 7—Gas lifting both zones of a dually-completed well completely parallel-type installation with separate injection gas sources.

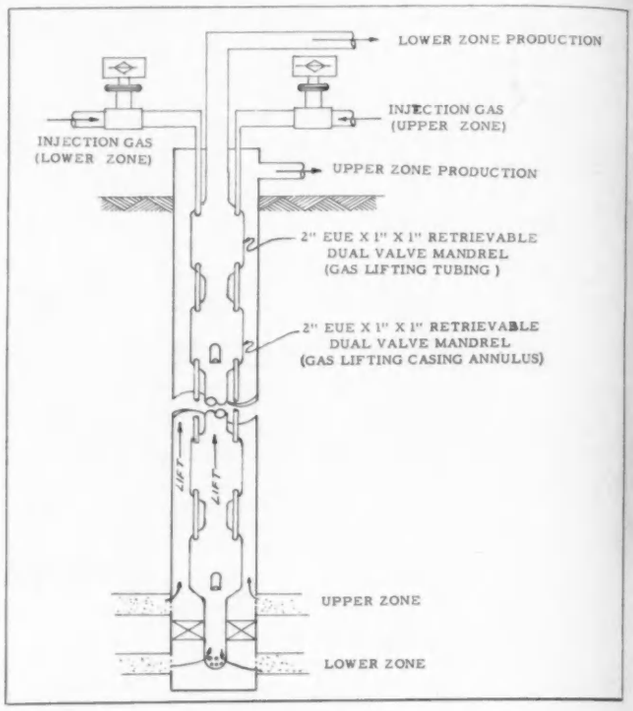

LOWER ZONE PRODUCTION
INJECTION GAS (UPPER ZONE)
INJECTION GAS (LOWER ZONE)
UPPER ZONE PRODUCTION
2" EUE X 1" X 1" RETRIEVABLE DUAL VALVE MANDREL (GAS LIFTING TUBING)
2" EUE X 1" X 1" RETRIEVABLE DUAL VALVE MANDREL (GAS LIFTING CASING ANNULUS)
LIFT
LIFT
UPPER ZONE
LOWER ZONE

FIGURE 8—Gas lifting two zones of a dually-completed well three parallel strings employing retrievable mandrels with separate injection gas sources.

be run on the other string of tubing, and the injection gas would be supplied from the casing annulus.

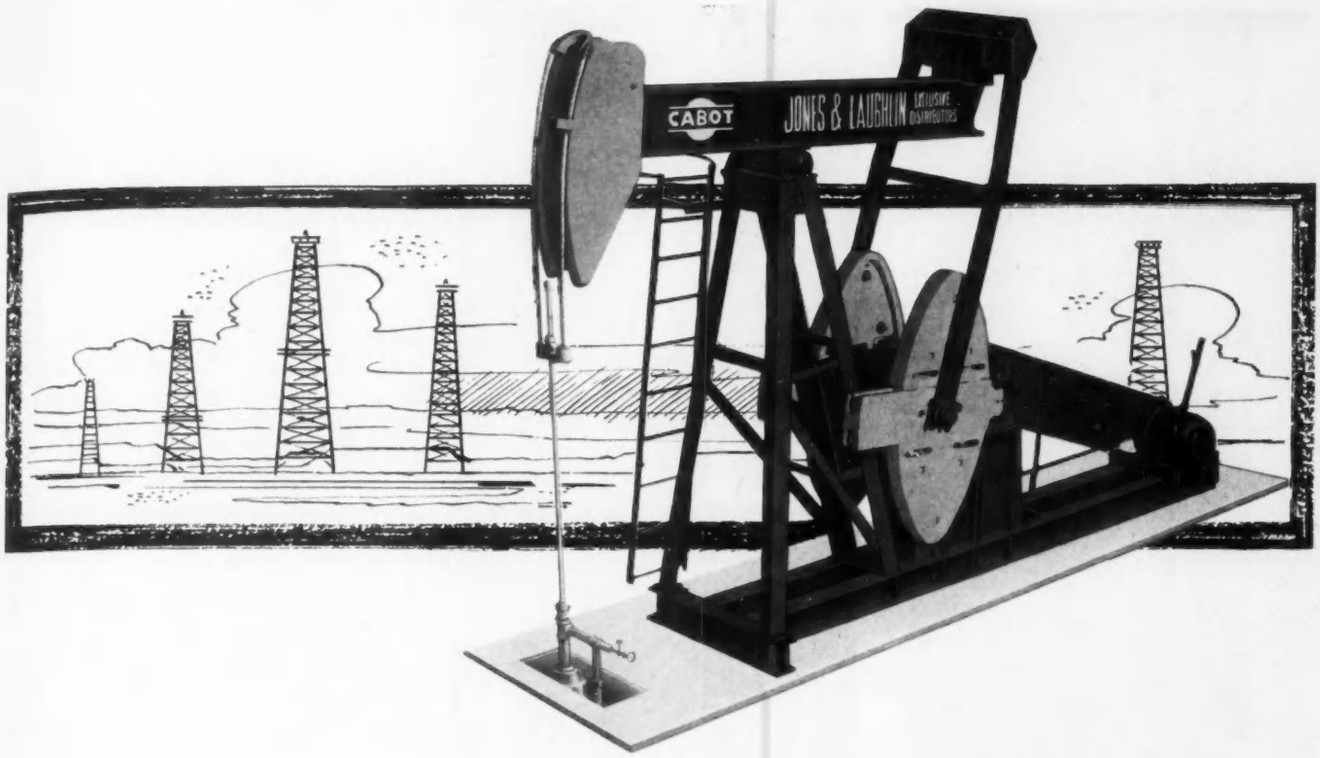
- Injecting gas in one tubing string and a smaller tubing string to lift through the casing annulus and the other tubing. The installation is the same as the previous type with the exception of casing flow mandrels being substituted for the conventional or concave mandrels on one string of tubing. This installation is desirable when very high producing rates are required from one zone.
- Gas lift with three string retrievable equipment. The most recent development in wire line retrievable flow valves for three string duals incorporates one 2-inch tubing string with two 1-inch line pipe strings strapped to the tubing, Figure 8. Retrievable valve mandrels can be obtained which permit gas lifting through one of the 1-inch strings with injection gas from the other 1-inch string. The tubing is lifted by injection gas from the casing. If both zones have a high productivity, the mandrels can be constructed to gas lift the tubing and casing by individual gas supplies from a separate 1-inch string for each zone. All flow valves are selectively retrievable from the full open 2-inch tubing string, and the mandrels are designed to be run in 5½-inch OD-17-pound casing.

A LOOK AT THE FUTURE

- **TREND OF THINKING is toward slim hole drilling and permanent type well completions. If this continues, full open-retrievable type gas lift equipment will be required for small tubing sizes, to be run in dual gas lift installations.**
- **SPECIAL EQUIPMENT being manufactured which will permit completion, workover, and recompletion of not only the lower zone, but also upper zone of a dual with both zones on gas lift.**
- **THIS EQUIPMENT can be run inside 5 ½-inch OD casing. With development of special packers, crossover tools, and tubing wellheads, which provide full open tubing strings in dual installations, gas lift manufacturers will strive to use these advancements by designing gas lift equipment which will provide greater flexibility and efficiency for dually-lifted wells.**

ACKNOWLEDGMENT
Presented at the Short Course on Oil Lifting Methods, sponsored by Texas Technological College, Lubbock, Texas.

—The End



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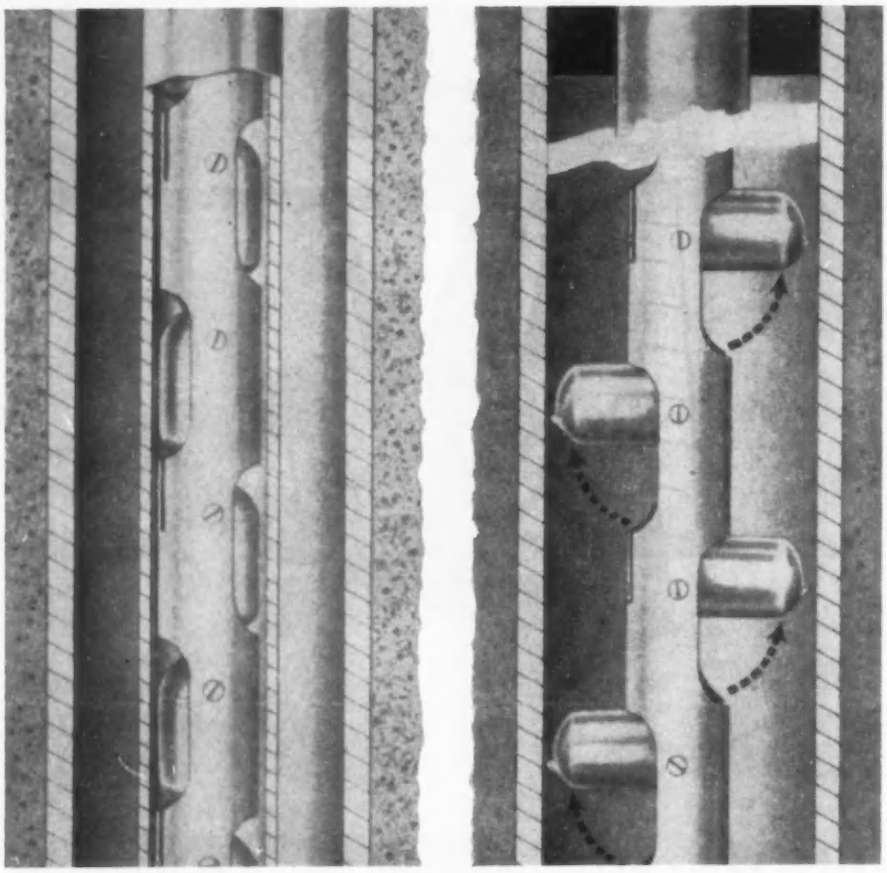


FIGURE 1—Swing-jet perforating gun designed to be run inside tubing. At left is the running-in position; right is firing position.

What's New in Production Trends and Equipment

Continuous advancements are being made toward greater recovery efficiencies and lower production costs. Here's a review.

By H. A. RANKIN, Chief Petroleum Engineer,
Houston Oil Company of Texas, Houston

PRODUCTION METHODS and equipment are being advanced continuously toward producing more of the oil discovered at lower costs. A review of the past year reveals an accelerating trend as proven practices are improved and new ideas developed in the laboratory are put into field application.

In regard to advanced and new equipment design, a relationship of close cooperation has developed between the manufacturer (and service company) and the oil operator to the extent that there is a minimum delay in furnishing new and improved production equipment and methods.

During 1955, it is anticipated that approximately 25,000 wells will be placed on some form of artificial lift for the first time. If, through improved design, the cost of these installations can be reduced by $100 per well over previous installations, a saving of $2.5 million can be realized. This money can be applied to additional drilling or production of more oil through reduced lifting costs.

It is a difficult task, indeed, to discuss in detail all the advancements made in production methods and equipment. Therefore only a few of these developments will be presented, and not necessarily in the order of their importance.

Perforating techniques. The acceptance of permanent-type well completions by the drilling and production industry was contingent, in part, on the development of a perforating tool capable of being run and pulled through the tubing and at the same time retaining the advantages of the larger diameter perforators.

Such a tool is represented by the swing-jet gun. The gun passes through the tubing with the charge carriers in a retracted position in the body. When in firing position the carriers swing out to provide proper stand-off for maximum penetration. The retraction feature of the gun also allows the use of energy charge volumes approaching that of large diameter perforators. This type perforator is shown in Figure 1. There are several powerful tubing-type perforating guns, and the swing-jet is one of them and represents the latest innovation in design.

Fracturing and sand control. During the past few years wide recognition has been given to the application of formation fracturing and propping agents to increases in productivity of oil and gas wells. Pumping equipment used in the fracture process was essentially the same machinery employed in acidizing and cementing operations. While the available equipment gave satisfactory performance in many cases, it is now recognized that in some areas fracturing success will be dependent on increased rate of placement of the gel-sand mixture.

The service companies have answered industry's need for increased pump capacity by unitizing larger pumps and prime movers. Where the previous high-pressure, high-volume fracture jobs required 8 to 10 pumpers they are now performed using 1 or

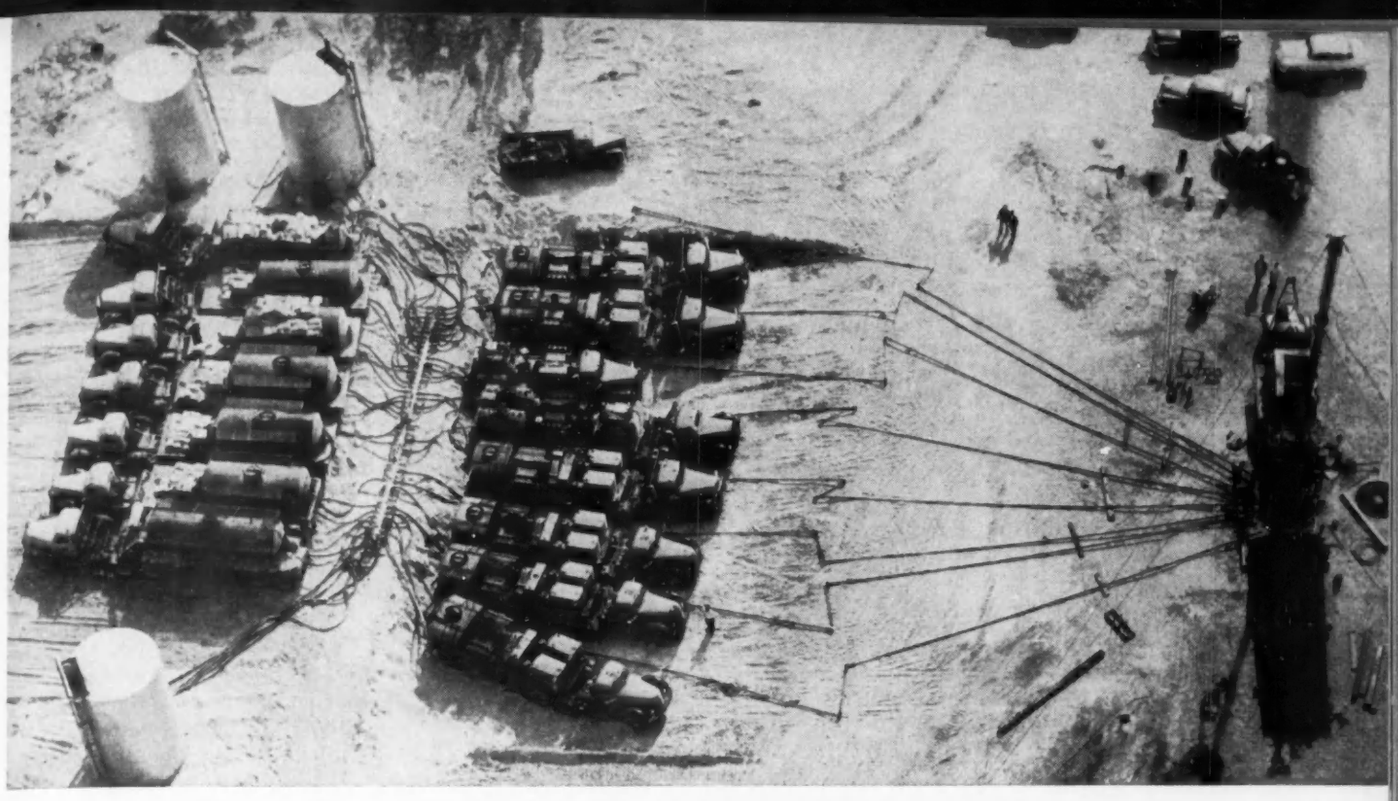


FIGURE 2—High-volume, high-pressure fracturing met with unusual success and set off a new approach to well stimulation.

2 trucks with an appreciable reduction in service cost. (See Figure 2.)

Control of sand from unconsolidated formations has long been a problem to the production operator and has been attacked by the use of screens, slotted pipe, and plastic stabilization of the sand grains. Although formation fracturing originally was looked upon as a means of increasing productivity, it has been found that the process has also modified or, in some cases, eliminated sand production by virtue of decrease in fluid velocity in the immediate vicinity of the well bore. In order to give the operator additional insurance against sand production, a procedure has been developed whereby the fracturing operation is followed immediately by placement of sand around a retaining liner thus reducing to a minimum the movement of sand to the well bore. A well completion utilizing this technique is shown graphically in Figure 3.

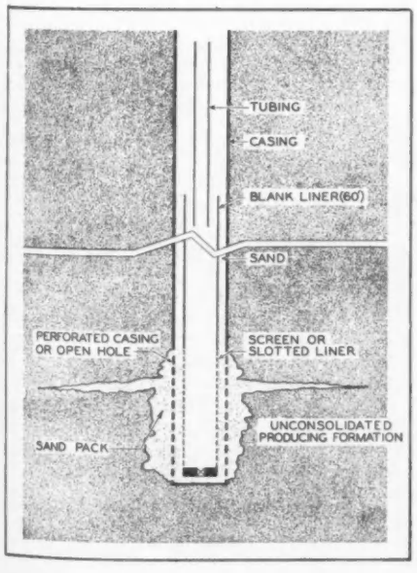


FIGURE 3—New sand control technique was introduced last year and overcame many production problems related to sand production.

Tubular and surface connections. Following the trend of increased producing depths and pressures, the oil and gas producer has progressively demanded flow string and surface connections having greater working pressure ratings. In the case of tubular goods, the coupling must be capable of retaining hydraulic pressure and at the same time form a joint that is equally as strong as the pipe body in tension. Surface connections must provide the desired pressure seal with a minimum of steel being used.

The seal depicted in Figure 4 was designed to withstand high pressure and still keep the amount of metal required to a minimum. The sealing element in the tubing joint consists of a metal ring inserted at the point of make-up. The outer surface of the seal ring and the inner surface of the tubing are machined to a slightly different bevel which provides considerable mechanical advantage in making the metal-to-metal contact.

Connections between component parts of christmas trees are made in the manner described above; however, in this case makeup is obtained

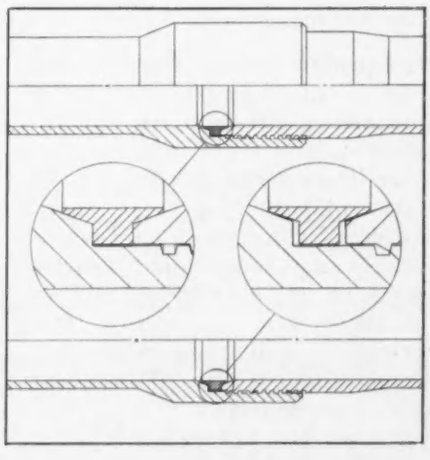


FIGURE 4—New type tubing joint seal designed to withstand high pressures and yet minimize the metal wall thickness at the joint.

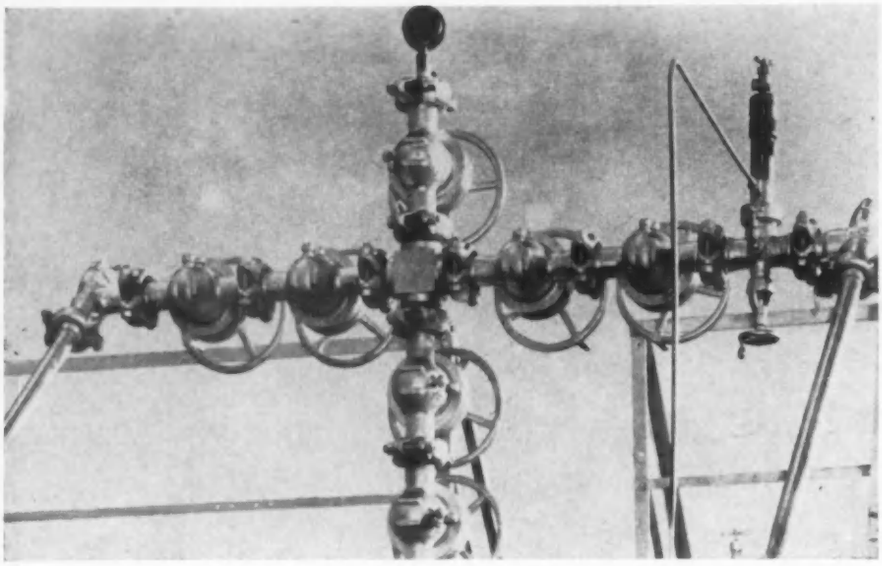


FIGURE 5—High-pressure connections on Christmas tree. Joint is similar to that shown in Figure 4, but is clamped together to minimize length of connection, and materially reduce the size of well heads for this type service.

by a clamp across the connections as shown in Figure 5.

Parallel tubing strings. The economic advantage of twin or triple completion through a common well bore has been recognized by operators for some time. However, unless one formation flows through the annular space between tubing and casing, the usual dual completion consists of three concentric strings having a complex packer arrangement.

A number of manufacturers are now able to furnish tubing heads and packers designed to handle two separate flow strings thus facilitating the dual completion. Down the hole equipment consists of a single string packer above the lower producing zone with both strings passing through or connected to the dual packer set above the upper zone.

Hydraulic power transmission. Wide acceptance of hydraulic actuated motors has been had in many industries and application has been made from operation of aircraft auxiliary equipment to rock crushing machinery. Simplicity and flexibility features make hydraulic systems readily adaptable to drilling and production power requirements. Basic parts of the system consist of a prime mover, pump, motor, oil reservoir, and connecting lines. System design relates pressure to torque and volume to speed with the horsepower requirement being set by the two variables. Speed control may be had by routing a portion of the flow around the motor. The system automatically picks up torque loading to the design maximum and overload protection is provided by pressure relief valves.

Pictured in Figure 7 is an air cooler fan which is rotated by a hydraulic motor receiving power from a pump connected to the engine crankshaft.

Crude oil absorption. In the interest of operating efficiency and conservation of natural resources it is desirable to recover the maximum volume of liquid hydrocarbons possible at surface storage conditions. In many cases stock tank liquids may be undersaturated with respect to butane and gasoline fractions due to temperature or pressure to which the liquid has been exposed prior to storage.

Where economic justification can be made, liquid recovery is usually increased by bringing the flash vapors into contact with lean absorption oil and then fractionating off the desired products. In case the volume of liquids involved do not warrant an absorption plant, the potential products are vented to atmosphere.

In this regard, one operator utilizes an absorption process consisting of a minimum of equipment using lease crude as the absorber medium. Recontacting the crude oil with field gas at increased pressure and then stabilizing the liquid through two stages of fractionation provides increased recovery.

Automatic production controls. Development of offshore production

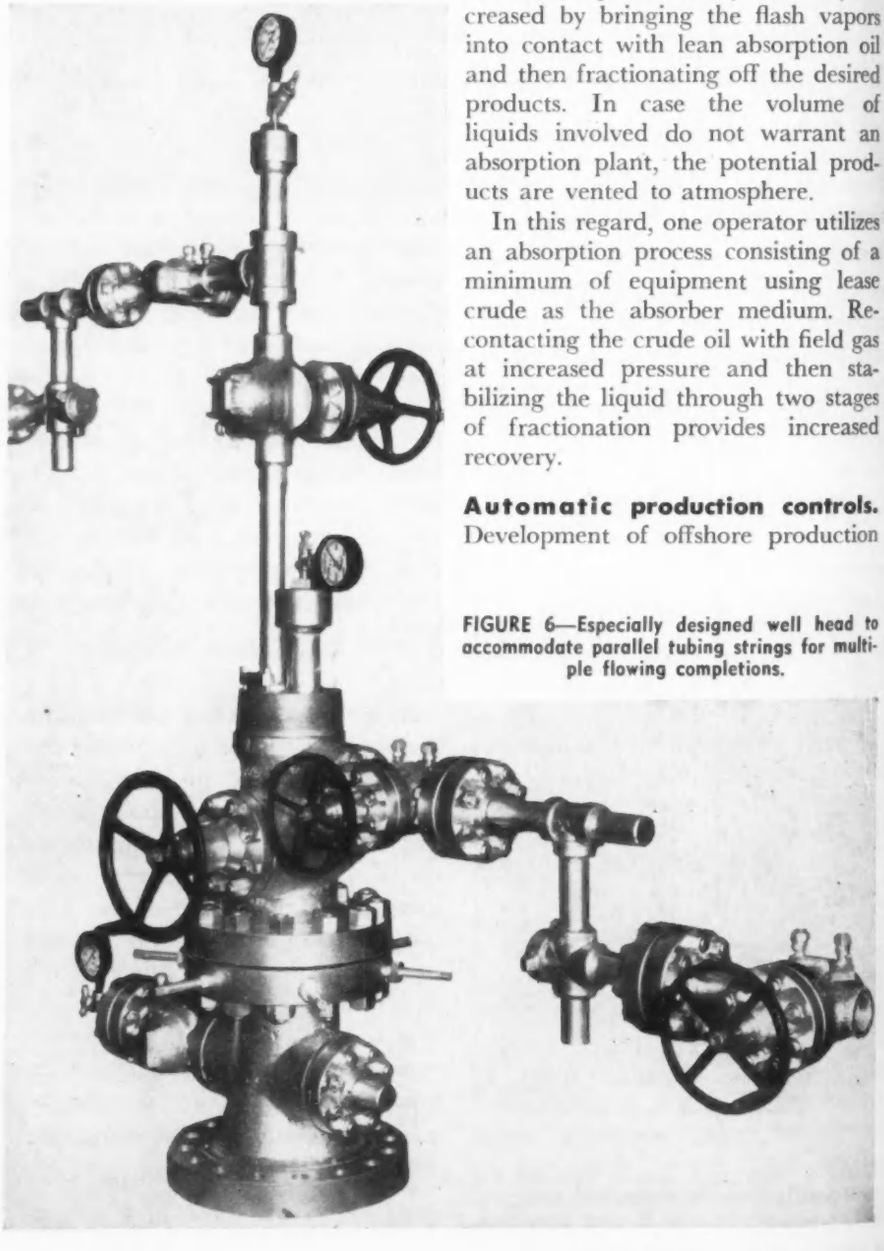


FIGURE 6—Especially designed well head to accommodate parallel tubing strings for multiple flowing completions.

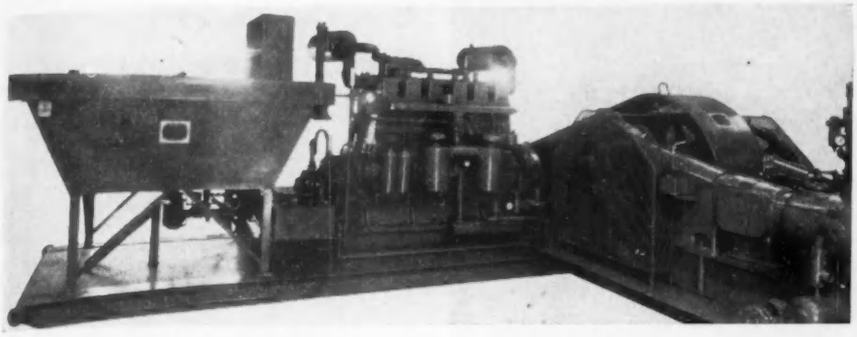


FIGURE 7—The air-cooler fan at left is driven by hydraulic power. A small pump attached to engine transmits fluid to a hydraulic motor which drives the fan.

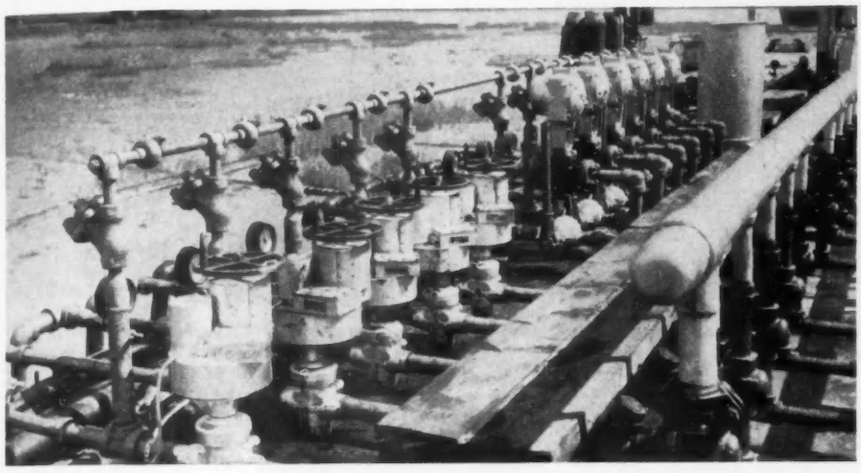


FIGURE 8—Motor valves located on individual flow lines connecting into a centralized tank battery control flow automatically. VHF radio provides the connecting link between field and office.

has created the need for means of regulation of well flow and liquid storage without having full time personnel situated at the remote location.

In order to provide two primary services between the control point and offshore location one company has used VHF signal transmission through multiplexing equipment. The two services performed are: (1) operation of wells and tanks, (2) indication of status of equipment.

Signals to the remote location open or close wells, place auxiliary equipment in operation, and switch tanks. Signals from the location show which wells are flowing, fluid level in active tanks, separator fluid level.

Past experience has shown the advantages to be gained by injection of water to displace oil to the well bore and maintain pressure in the reservoir. The usual method of water-flood consists of driving the oil from the structural edge to up-dip recovery wells.

A program of water injection from center-to-edge of the structure is now operating in the Kelly Snyder field of the Scurry Reef Trend and from all indications excellent results are being obtained. Transfer of allowables from edge wells to those immediately ahead of the water front provides pressure maintenance over the entire reservoir and a maximum of liquids are displaced per unit of injected water. The problem of production regulation for the simultaneous convergence of two flood fronts is eliminated. Injection wells which are drilled through the entire reef section reduce the possibility of water bypassing particular sections of formation.

ACKNOWLEDGMENT

This paper originally presented before the Houston Chapter of API, March 1, 1955, Houston.

—**The End**

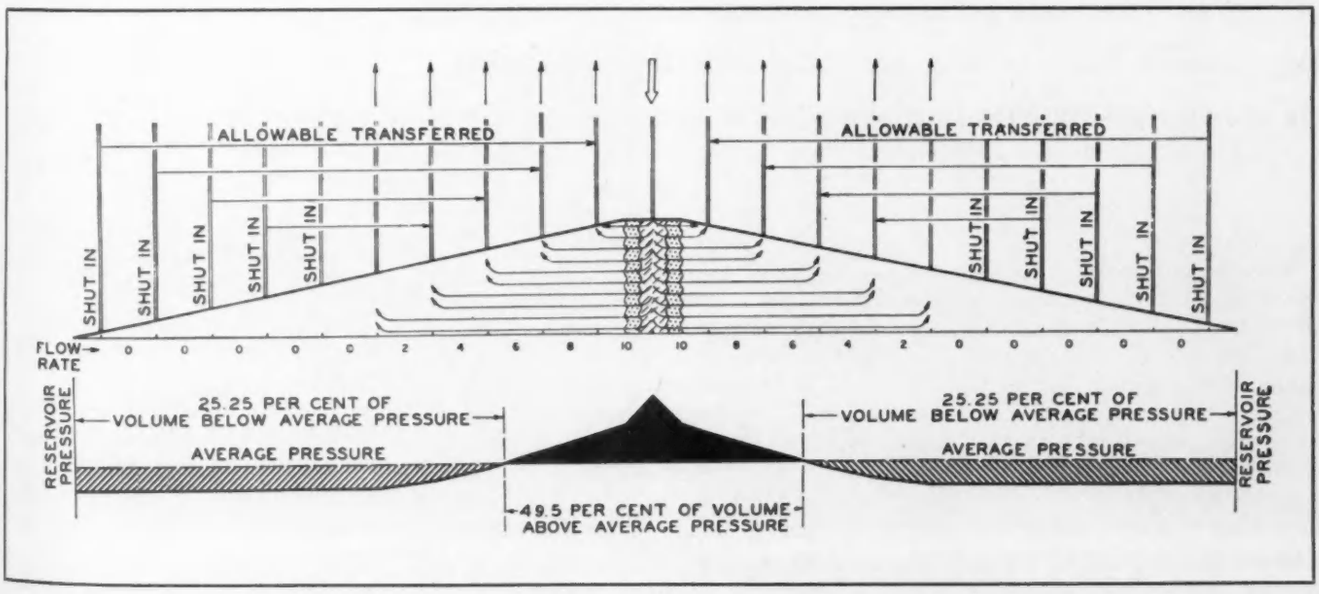
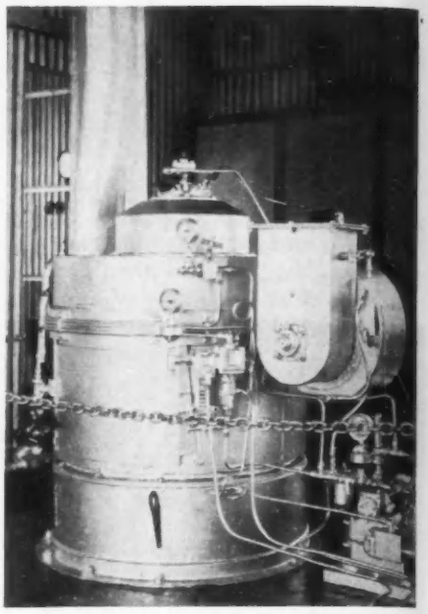


FIGURE 9—New conception of pressure maintenance by water injection is illustrated for the "center-to-edge" idea recently incorporated in a large unitized field in West Texas.

1 One of Gulf Refining Company's paraffin barges churns to a job in the Timbalier Bay area of the Louisiana Gulf Coast.

Workhorse of the marshes at work . . .



2 Automatic steam generator produces 600 pounds working steam pressure in three minutes from cold water and makes 1100 pounds of steam an hour. This is accomplished by efficient forced draft fire, burning No. 2 oil, fuel oil, or kerosine. Hot gases from fire wipe over steel coils through wh.ch water is pumped. As water proceeds through coils, it is turned into high-pressure steam. After machine is started, automatic controls take over causing steam generator to go on and off making steam only when needed.

Paraffin Barges Do Many Jobs in Coastal Fields

They are performing such operations as scraping paraffin from tubing, steaming flow lines, cleaning christmas trees and running wire line instruments.

SOME OF THE most interesting work horses in the bay and marsh-located oil fields of south Louisiana are the Gulf Refining Company's paraffin barges, self-propelled barges 60 feet long, 20 feet wide, and 5 feet deep. They are operated with two or three men crews who perform such jobs as scraping paraffin out of well tubing, steaming paraffin from flowlines, cleaning and painting christmas trees, running bottom hole pressure instruments and safety valves, and other wire line work.

Typical of these paraffin barge operations is that of Barge No. 3724 in Gulf's Timbalier Bay field located approximately 90 miles south and west of New Orleans in LaFourche Parish. This field is supplied from a dock at Leesville, La. from which paraffin barge crews travel by taxi boat to and from the field each morning and evening along with other field operating personnel.

Barge No. 3724, of standard size, has a draft of from two to four feet, depending on the loading. It is propelled by a 175 horsepower outboard propelling unit of a type utilized during World War II to propel supply barges to the beaches during military invasions.

The after portion of the barge deck is covered by a 24 feet by 16 feet by 8 feet galvanized corrugated iron building which has large doors opening toward the bow. Housed within this building are the control wheel, hand tools, work benches, paraffin scraping tools, wire line hoist and a 40-hp automatic steam generator which provides 600 psi steam for melting paraffin deposition in flowlines and cleaning operations.

Immediately forward of this building is open deck working space where the strings of wire line tools are assembled and broken down. This space can also be used to transport materials and supplies.

On either side of this working space are two 250-gallon horizontal cylin-

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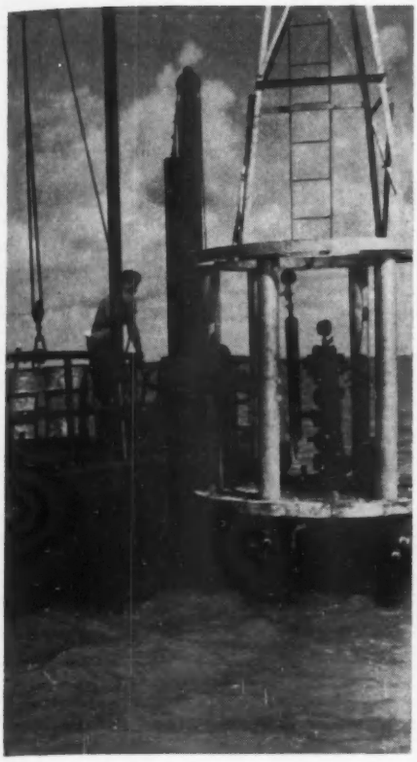
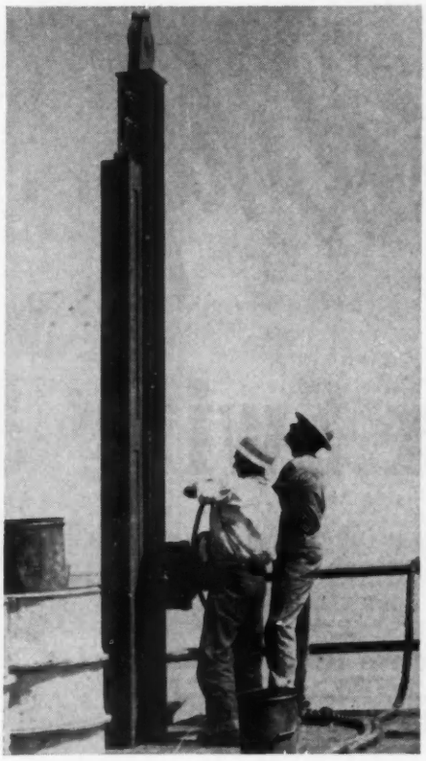
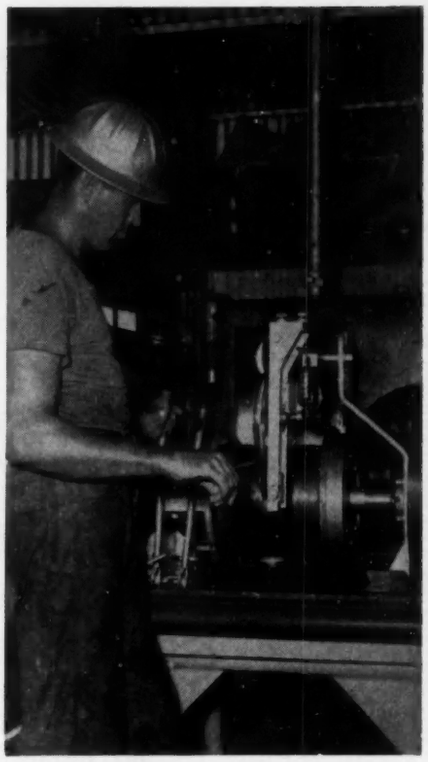


3 Paraffin barge moored to Gulf Refining Company oil well in Timbalier Bay.

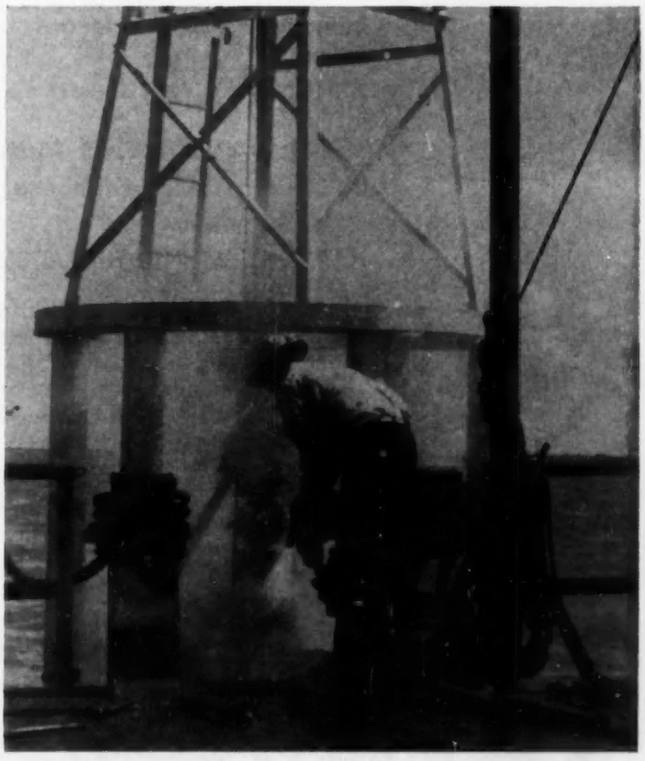


4 It's a two-man job to ra'se steel spud used to stabilize paraffin barge in position against well.



5 Operator watches measuring gage of wire reel to see how far down into well paraffin scraper has traveled.

6 Steam line is hooked onto oil flow line. Steam at 400 to 600-pound pressure is then fed into line for from 1 to 4 hours as needed.



7 Steam cleaning the christmas tree to remove the salt film before painting is a common job on wells in Timbalier Bay.

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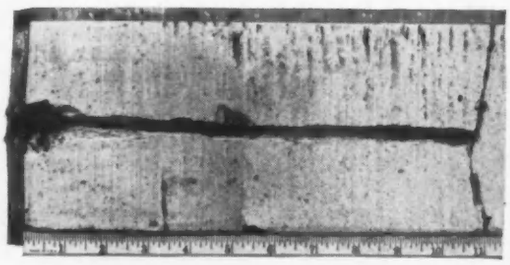

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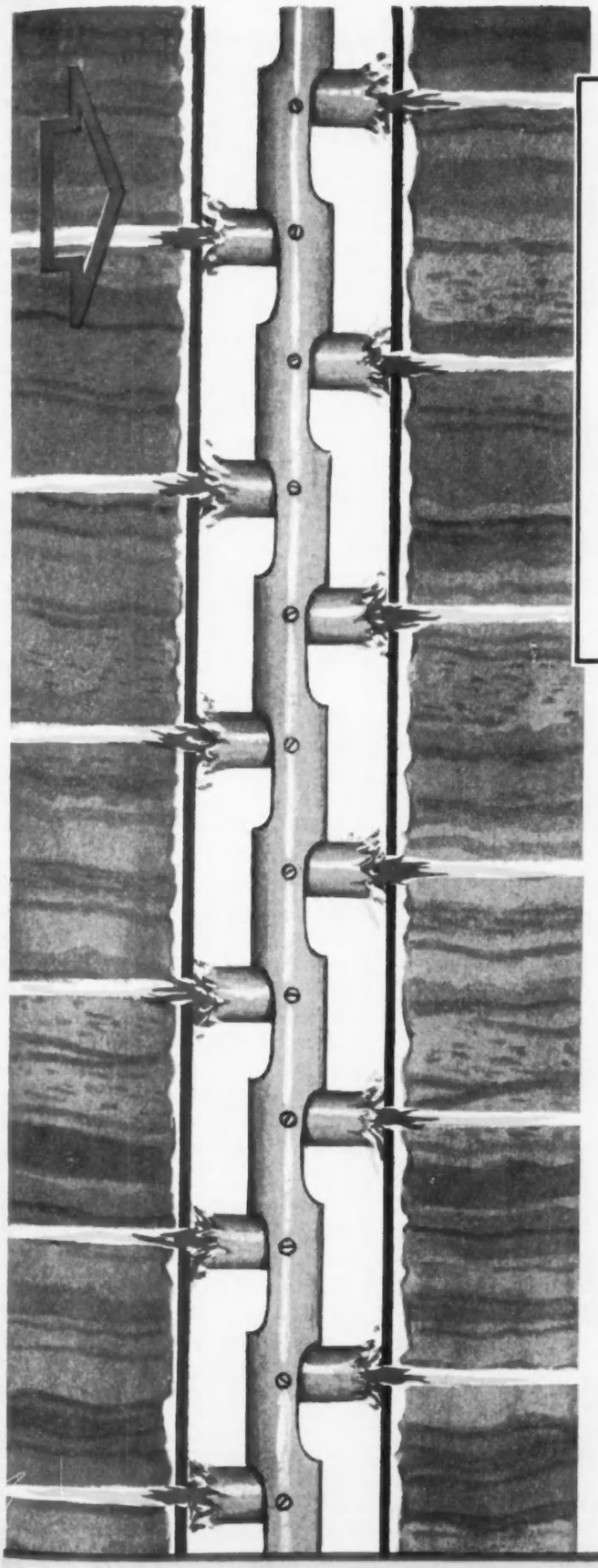

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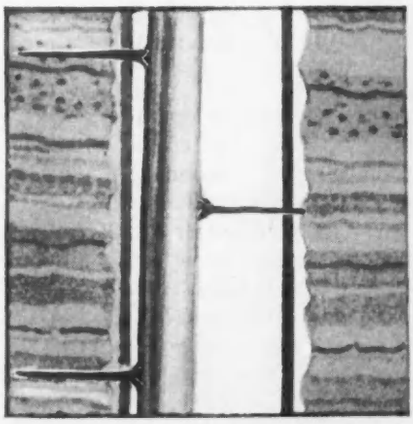

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How to Reduce Corrosion In Production Operations

• Corrosion long has been a problem in the Arbuckle production of Kansas.

• Cities Service hasn't eliminated the problem, but they have reduced maintenance expenses substantially with a large-scale mitigation program.

By W. C. KOGER, Cities Service Oil Company, Bartlesville

CORROSION IN PRODUCTION operations in Kansas has been a serious problem for many years. Practically all the equipment in the producing well, tank battery, and salt water disposal system is affected to some extent by the sour gas and brine associated with Arbuckle production. The effort devoted to the development of mitigation procedures has been rewarded with substantial reductions in maintenance expense, but has not completely eliminated corrosion from production operations.

The procedures discussed here have been used successfully by Cities Service Oil Company in Kansas and other areas.

Casing corrosion. Casing corrosion in Kansas is confined almost entirely to the outside of the oil string in the Dakota water sand. Failures resulting from internal corrosion of the oil string have occurred, but these are too small in number to deserve serious consideration.

The most severe casing corrosion has occurred in the northwest portion of the state with leaks ranging in depth from 300 to 1300 feet, depending upon the depth of the Dakota sand in the particular locality. New wells completed with short strings of surface pipe have developed leaks in 18 to 24 months.

The procedures used to combat this condition can be divided into two groups—those used at the time the casing is set, and those used after the well is completed.

There are three generally accepted methods of protecting the casing when the pipe is set, and these are listed in their probable order of effectiveness:

1. Long strings of surface pipe set through the Dakota sand with cement circulated to the surface.
2. Cementing the oil string through a stage-cementing collar from below the Dakota sand to the surface.
3. Using a stage-cementing collar to place a heavy oil-base material between the Dakota sand and the oil string.

Cities Service's experience has been limited, with one exception, to long strings of surface pipe and stage cementing. In areas where the Dakota sand is relatively shallow, 300 to 600 feet, long strings of surface pipe are used; below this depth, stage cementing is the usual procedure.

The advantage of a long string of surface pipe over stage-cementing or oil-base material is the positive isolation of the oil string from the Dakota water. This method of protection is the most expensive of the three, especially when exceptionally long strings of pipe are required to cover the Dakota sand.

Stage cementing is relatively inexpensive and has given good results to date. Protection with stage cementing depends upon placing a sheath of cement around the pipe. A poor cementing job would leave the pipe unprotected; therefore, stage cementing cannot be considered as effective as long strings of surface pipe.

Because company experience with oil-base materials is limited to one job of doubtful benefit, it will suffice to say that protection depends upon complete isolation of the oil string from the Dakota water and that the oil-base material is relatively expensive.

Protective measures used at the time the well is completed affords a more positive means of protection than those used after the wells are completed and should be used in all known corrosive areas.

Many wells have been completed with short strings of surface pipe in areas that were not known to be corrosive and, for this reason, it has been necessary to develop methods for protecting the casing in these wells. Any method used for this purpose must be cheap enough to be used on a large number of wells. Cathodic protection meets this requirement and has been used extensively for this purpose.

Three sources of current for cathodic protection are being used at present: (1) magnesium anodes, (2) rectifiers and (3) direct-current generators. Experience has been limited to magnesium anodes because very few company leases are electrified and direct-current generators are still in the experimental stage.

Anodes are on approximately 100 company wells in Kansas and the results have been good to date. It would be erroneous to state that these wells are completely protected because the current output of the anodes, in many cases, is not sufficient to justify this claim. This program was initiated when very little information on the use of anodes for this purpose was available and it is obvious now that

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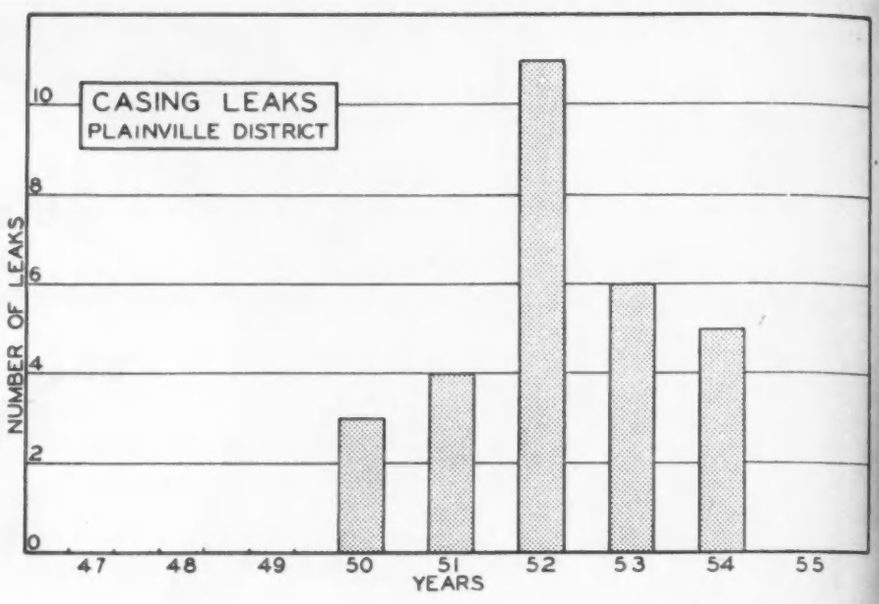

FIGURE 1

several mistakes were made. It is evident now that the design of the anode beds should receive considerably more attention than in the past and that the practice of burying a specific number of anodes in the old reserve pit is impractical. The present trend is to design the anode bed for the amount of current that is required.

Figure 1 is a summary of the results of the casing-protection program in one district. This district is in an area of severe casing corrosion and shows the benefits that have been obtained from stage cementing and cathodic protection. All new wells completed in the area are stage cemented through the Dakota sand and all old wells that are not considered marginal have been protected with anodes. Because the cathodic protection is inadequate, the results that could be obatined from adequate protection should be considerably better. On the basis of these results, an expansion of the program is planned, with particular emphasis on designing the anode bed for the required current to protect the casing.

Cathodic protection of treating equipment. The failure of treating equipment as a result of corrosion has been responsible for the extensive use of wood tanks in treating systems in Kansas. The trend away from wood tanks was brought about by the severe emulsion-treating problem experienced with the production of low-gravity Arbuckle crude. The heat necessary to break the emulsion caused rapid deterioration of wood tanks and the excelsior sections required to strip the fine water droplets from the crude were expensive to install.

Various coatings were used in an effort to protect the steel vessels from corrosion, but the coatings failed to give the desired service and test installations for cathodic protection were made. Cathodic protection proved both effective and economical for this service, and the program has been expanded to include all the heater treaters and free-water knockouts in west Kansas. The effectiveness of this program is obvious in that no leaks have occurred in the treater shells or free-water knockouts since the vessels have been protected. Three fire-tube leaks have occurred in recesses where cathodic protection would not be expected to be effective. This program has been in effect four years and treaters have been in service for this time without any evidence of corrosion in one pool where the life of unprotected treaters was only four years.

It was obvious from the start of this program that it would be difficult, if not impossible, to protect all of the tubes, sections, and external equipment on some of the more elaborate treaters. Because much of this equipment was unnecessary or of questionable value in this area, the

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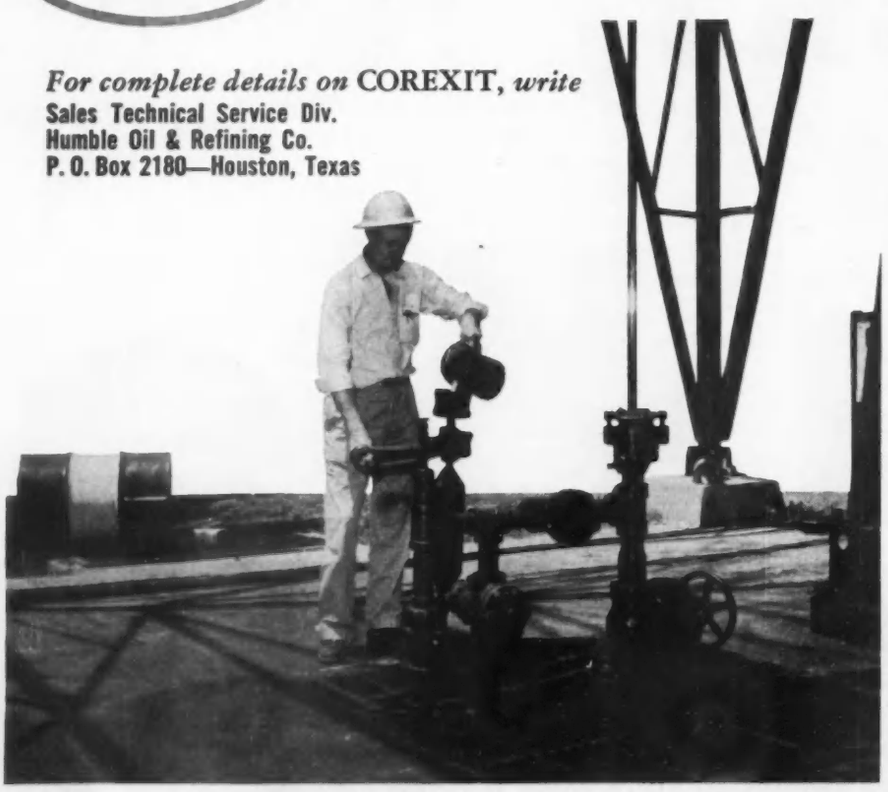

logical solution was to use equipment that could be protected. Gun-barrel type treaters with six-inch excelsior sections were selected for this service and they have proved satisfactory both from the standpoint of cathodic protection and oil treating. When the water increases to the point that a free-water knockout is required, a vessel is used that can be protected with anodes. By following this procedure, repair jobs on heater treaters and free-water knockouts have been eliminated almost completely and the initial cost of the treating system has been kept to a minimum.

Equipment and procedures used in the field should be kept as simple as possible for two reasons.

1. Field conditions are seldom ideal; therefore, the efficiency gained by elaborate procedures is usually lost in the field.

2. Maintenance of elaborate equipment under adverse conditions discourages the men using such equipment.

For these reasons, the anode installations have been simplified to the point that they can be installed and maintained with material available in most localities. The anodes are placed in 8 inch x 8 inch x 16 inch concrete blocks in the center of the treater, approximately 4 feet apart; and the lead wires are brought out of the treater through stuffing boxes in the cleanout plate. The stuffing box is made from a ⅜-inch by ½-inch copper tube fitting with two small washers and a perforating gun rubber. The stuffing box is screwed into a ⅜-inch pipe collar welded on the cleanout plate. A cadweld unit is used to weld the lead wires to the vessel and the soldering is done with a prepo torch. Nichrome resistance wire is used for the external resistance, and the necessary readings are taken with a multimeter. This simplified procedure has had good field acceptance which has undoubtedly contributed to the success of the program.

The cost of cathodic protection depends upon the amount of magnesium used and the method used to replace the depleted anodes. In the past, two 50-pound anodes have been used in all installations without regard to the

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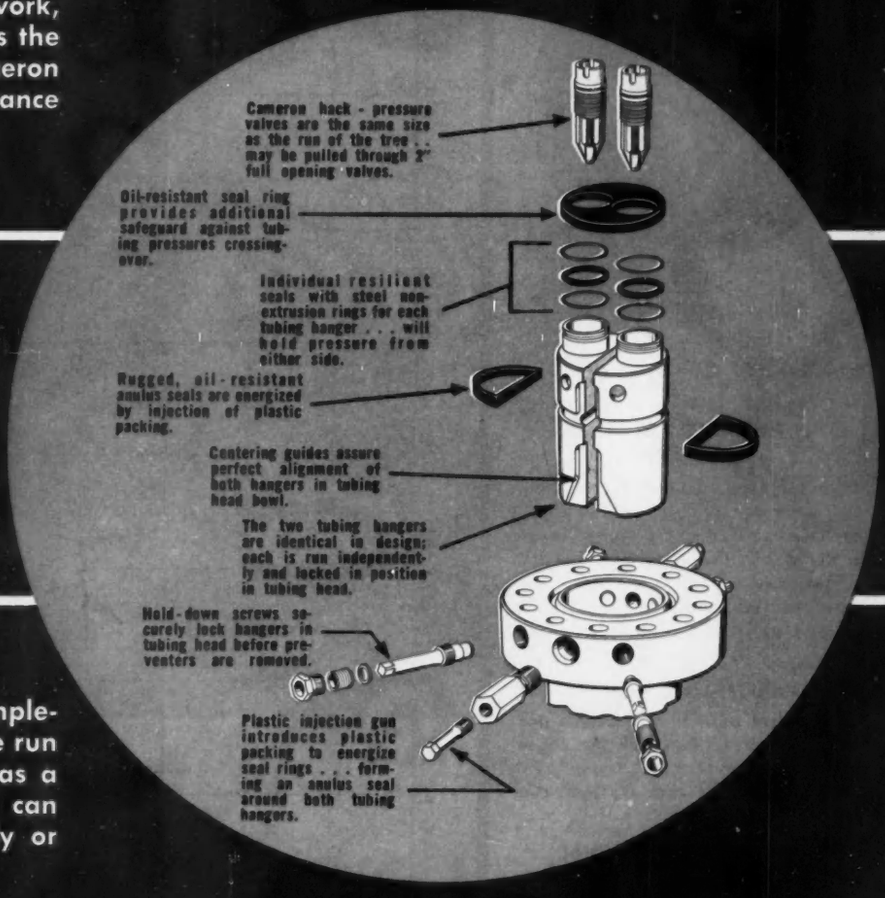
In the Cameron "DC" Dual Completion Method, either string can be run in precisely the same manner as a single zone completion—they can be run or pulled independently or simultaneously.


Cameron back - pressure valves are the same size as the run of the tree . . may be pulled through 2" full opening valves.
Oil-resistant seal ring provides additional safeguard against tubing pressures crossing-over.
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Rugged, oil-resistant anulus seals are energized by injection of plastic packing.
Centering guides assure perfect alignment of both hangers in tubing head bowl.
The two tubing hangers are identical in design; each is run independently and locked in position in tubing head.
Hold-down screws securely lock hangers in tubing head before preventers are removed.
Plastic injection gun introduces plastic packing to energize seal rings . . . forming an anulus seal around both tubing hangers.

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Each tubing string is suspended, locked securely in the tubing head, and sealed before preventers are removed. The tree may then be installed and flowline connections made before removing the back-pressure valves and washing the well into production.

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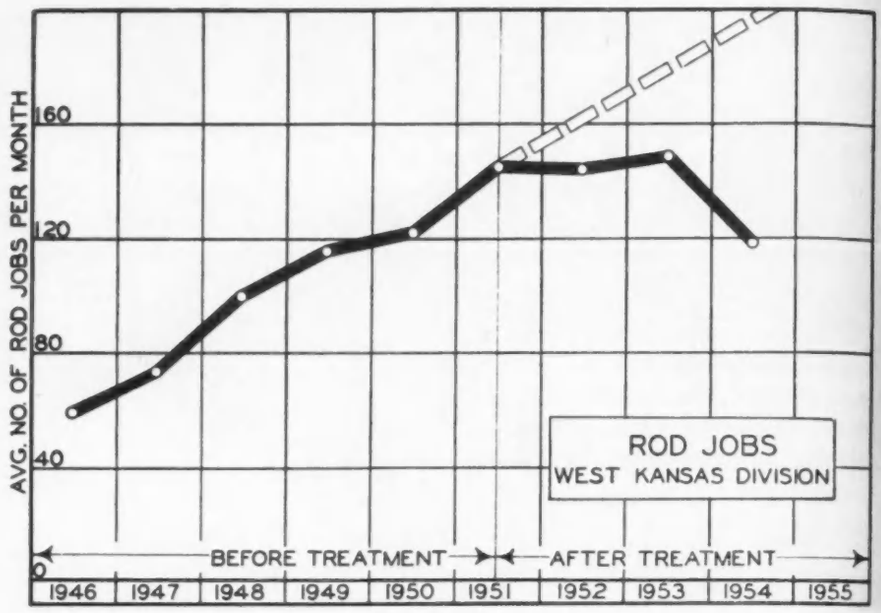


FIGURE 2

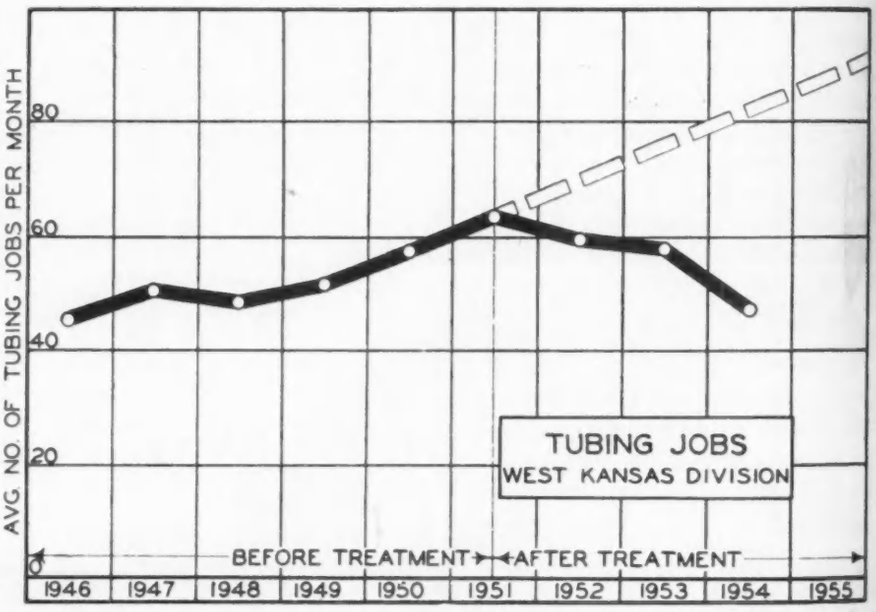


FIGURE 3

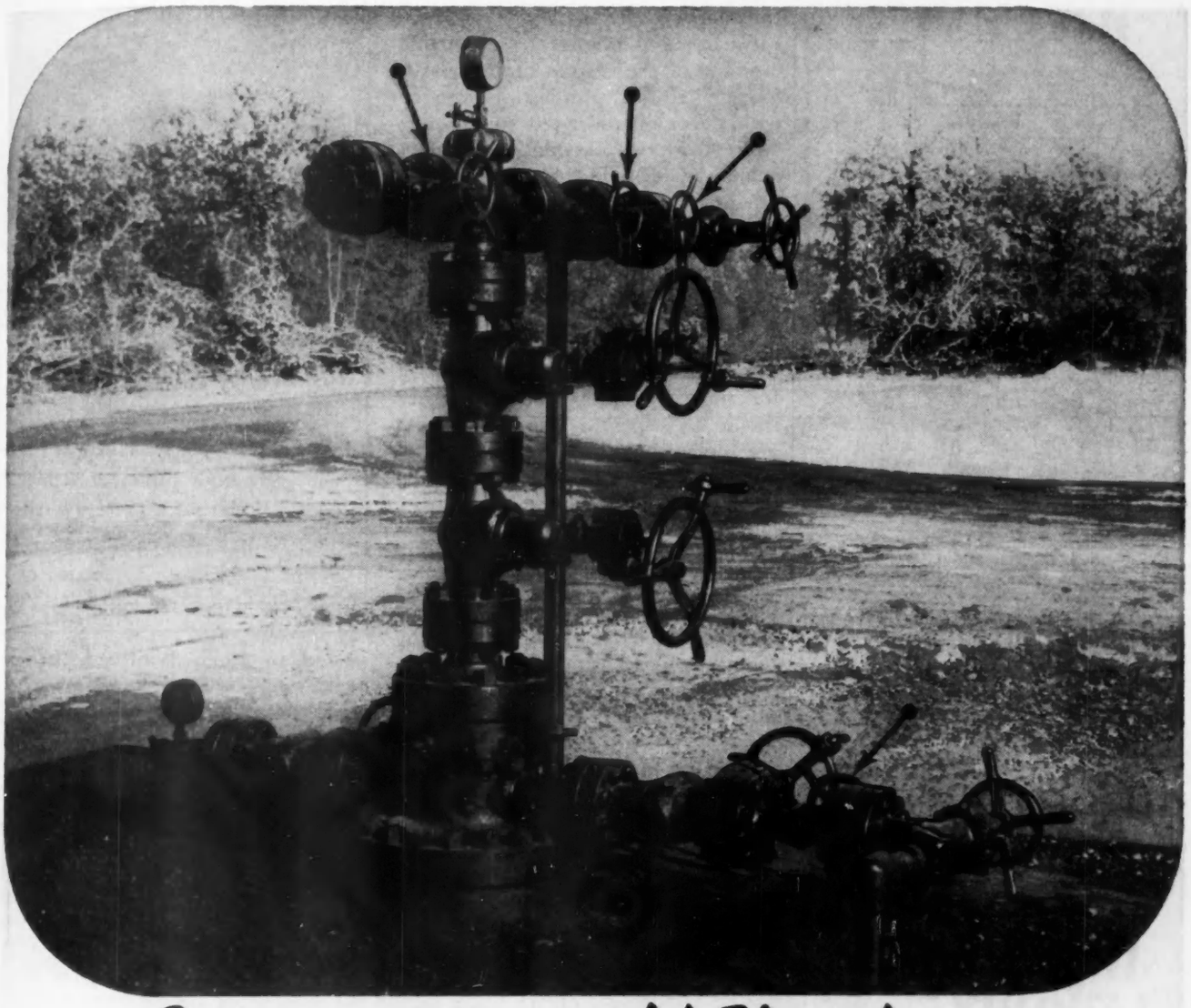
amount of surface to be protected. Three installations are now on test using two 100-pound anodes which should increase the time between anode changes to approximately four years in the larger vessels. The life of an anode installation can be estimated with the following formula:

$$\frac{\text{Pounds of magnesium}}{\text{area (sq ft)}} \times 9.13 = \text{years}$$

An anode efficiency of 40 percent and a current density of 5 Ma per square foot are used in this calculation. The amount of current required to polarize the vessel has not been considered in the formula; therefore, the indicated life will be slightly higher than the actual life of the installation.

To keep the cost of changing the anodes to a minimum, the pumper usually floats the oil out of the treater with the lease fluid and then drains the vessel. After the treater has been drained, it is a simple matter to remove the decomposition products and install new anodes.

Because the cost of cathodic protection depends upon the area to be protected, the amount of magnesium used and the method used to replace



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the depleted anodes, the cost will vary between installations. A reasonable estimate of the cost to protect a 10-foot by 16-foot gun-barrel treater with approximately 420 square feet of area with two 50-pound magnesium anodes would be $40 per year or approximately 10 cents per square foot of area protected per year.

Considerable attention is required to obtain the maximum benefit from anode installations. The current output should be checked periodically to determine whether the anodes are functioning properly and the treater should be inspected when the anodes are replaced. It has been found that 5 Ma per square foot will provide adequate protection in west Kansas, but each vessel is checked when the anodes are replaced. A thin layer of scale is desirable and is used as an indication of the proper current density. Excessive scale, caused by high current densities, is undesirable and using more current than is required also results in short anode life.

Corrosion in sour-crude wells. The damage of sucker rods and tubing by corrosion is one of the more serious problems in the production of Arbuckle crude. Inhibitors are being used extensively to combat this condition but the large number of inhibitors available and the difficulty experienced in selecting the most effective inhibitors for this service has also presented a problem.

Before our present inhibitor program was initiated in 1951, several different inhibitors were tested in the more corrosive pools in the area. The wells selected for these tests were known to be corrosive and the effectiveness of the inhibitor was measured by the reduction in maintenance expense. Because there are factors that can influence the maintenance expense other than the inhibitors, it was necessary to keep accurate records on these wells. Inhibitors selected by this method have performed satisfactorily as shown in Figures 2 and 3, which include all the rod and tubing jobs performed in the area regardless of the cause.

The program has been expanded from 45 wells in 1951 to 345 wells at present. The largest group of wells was put on treatment during 1952; therefore, the greatest reduction in maintenance expense would be expected in 1953. Waiting until the wells have failures before they are inhibited is a questionable procedure, but is almost a necessity when a large number of wells are involved.

The expense of treatment is more than justified by the indicated savings. The treating cost at present is $17.20 per well per month or $6545 per month for the group. The estimated savings on rod and tubing jobs was $12,220 per month during 1954. This represents a net savings of $5575 per month.

There are several factors that can influence the effectiveness of an inhibitor program that should be recognized and investigated. Some of the factors that should be considered are:

1. Failure to treat the well as recommended.
2. Condition of equipment.
3. Fluid pounds.
4. Rod stress.
5. Operating conditions.

The first point mentioned may seem ridiculous to some, but to those actually engaged in corrosion work it is a real problem. It is wise to discuss the treating procedure with the people responsible for the treatment. This gives the field men a chance to ask questions and also gives the person responsible for the work a chance to sell these men on the program.

Failures after inhibition may be caused by the poor condition of the equipment. Severely pitted rods and worn tubing cannot be expected to perform like new equipment and the

About the Author

W. C. KOGER graduated from the University of Arkansas in 1944, with a B.S. degree in chemical engineering. He joined Cities Services immediately, and became a corrosion engineer in the company's production division in 1946. At present he is at the company's headquarters in Bartlesville, as head of the corrosion and oil testing section of the Oil Production division.

inhibitor can only protect that portion of the material that remains. The usual procedure is to treat the wells giving trouble without making any major material replacements. It is impractical to replace the rods in each well put on treatment, but some break frequency should be selected and the rod string replaced at this point. Pitted and worn tubing can be eliminated from the tubing string by caliper surveys.

Fluid pounds are undesirable and should be eliminated, especially in corrosive wells. The additional oil that will result from pounding fluid, in many cases, is not sufficient to pay for the rod breaks.

The maximum allowable rod stress in a sour-crude environment is subject to debate but is considered to be in somewhere around 20,000 pounds per square inch. Selecting some value such as 20,000 psi and designing the rod strings for this value should minimize the overstressed condition so often encountered in wells producing large quantities of water.

Slight changes in operating conditions can sometimes increase the number of rod failures. Inhibitor

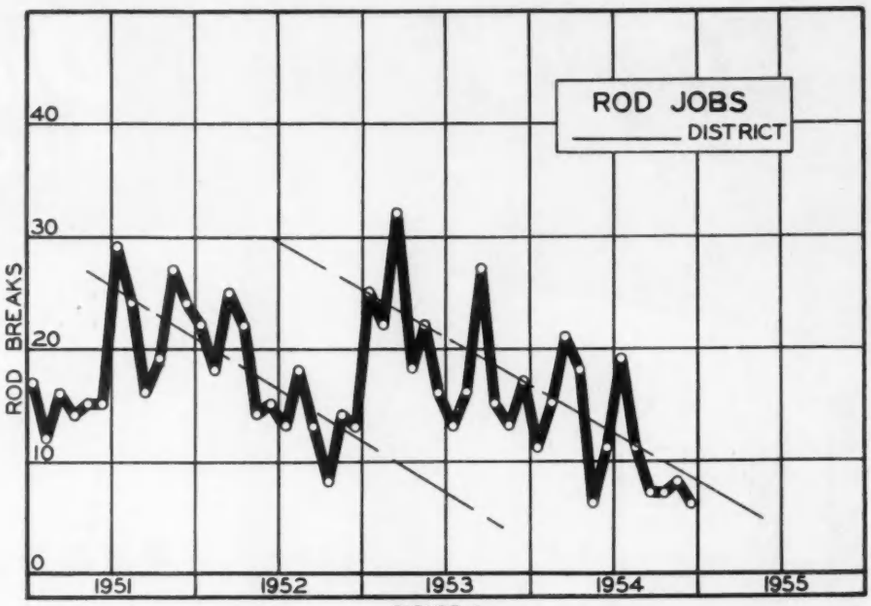

FIGURE 4

treatment was started in one district the latter part of 1951 and the maintenance expense was decreasing rapidly during 1952. In January of 1953, the pumping speed on all wells was increased one stroke per minute and the number of rod breaks increased immediately. Figure 4 points out the fact that pumping speed, length of stroke, and plunger size have considerable effect on the rod performance and that problem wells require considerable attention.

The amount of inhibitor used, how often the well is treated, and the flushing time all have some effect on the treating program. Semi-weekly treatment with 2 to 4 hours flush is more effective than daily treatment with very little flushing. The amount

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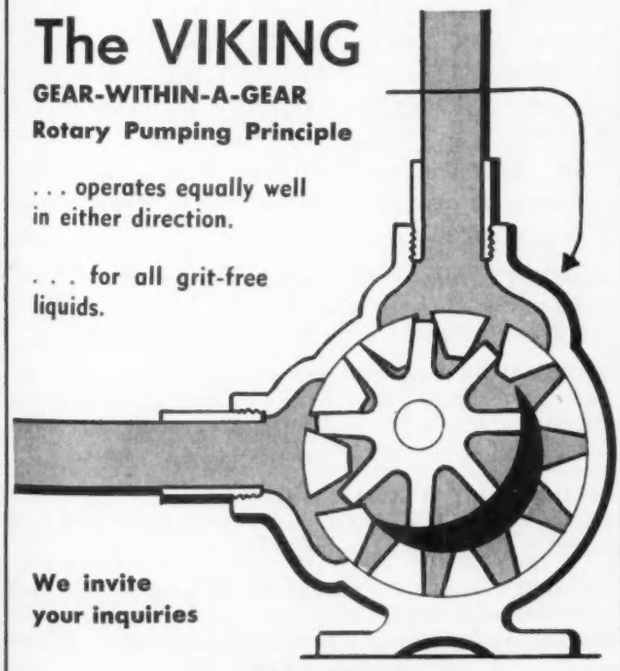

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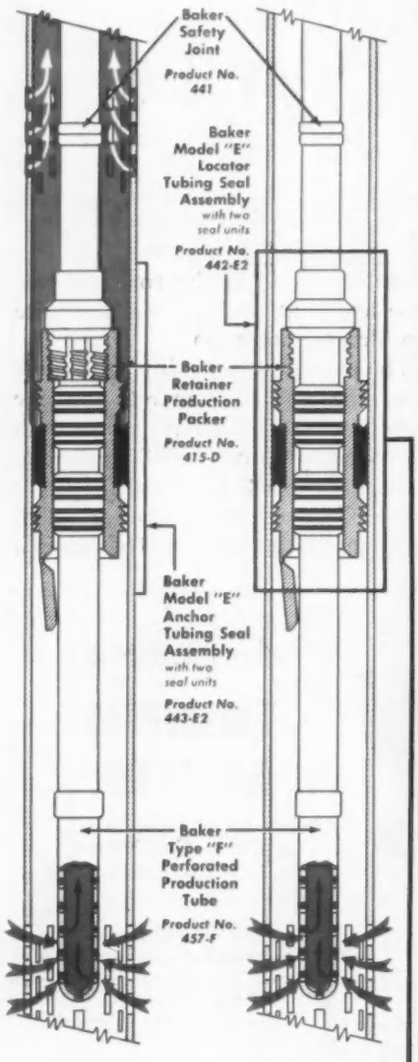
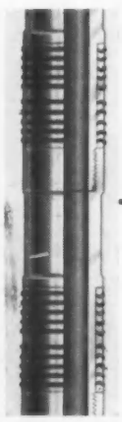
Single Zone Dual Zone PRODUCTION

WITH 1 BAKER

RETAINER PRODUCTION PACKER


Baker Safety Joint
Product No. 441
Baker Model "E" Locator Tubing Seal Assembly with two seal units
Product No. 442-E2
Baker Retainer Production Packer
Product No. 415-D
Baker Model "E" Anchor Tubing Seal Assembly with two seal units
Product No. 443-E2
Baker Type "E" Perforated Production Tube
Product No. 457-F
TYPICAL DUAL ZONE HOOKUP
TYPICAL SINGLE ZONE HOOKUP



Right: Picture shows actual detail of seal units

Do you know that with only ONE Baker Retainer Production Packer you can equip your well for *either* SINGLE ZONE or DUAL ZONE production? And that you can accomplish *any* type of completion for *any* method of production to meet *fixed* or *changing* well conditions?

A single Baker Retainer Production Packer will also outperform many specialized tools when used as a TESTING PACKER – SQUEEZE PACKER – GAS LIFT PACKER – PERMANENT COMPLETION PACKER – WATER FLOOD PACKER – GAS INJECTION PACKER – CORROSION CONTROL PACKER – TUBING ANCHOR – ONE-WAY BRIDGE PLUG – PERMANENT BRIDGE PLUG.

Every production man should be familiar with the many operating advantages of this "Universal Type" Packer, which include . . .

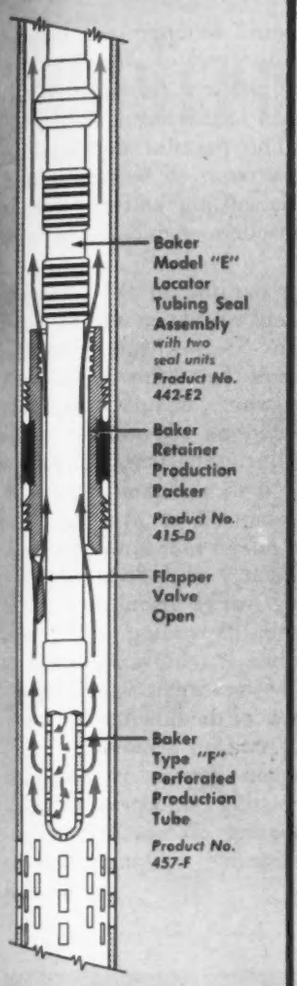
WIRE LINE SETTING—The packer can be set with *wire line speed and accuracy*, using the same set-up just used for perforating. The Baker Packer also can be set on drill pipe or tubing.

SETTING UNDER HIGH PRESSURE—By using a lubricator, the Baker Retainer Production Packer can be set under high pressure. From the moment it is set, the self-contained, flapper-type, back-pressure valve closes and isolates pressure below the packer.

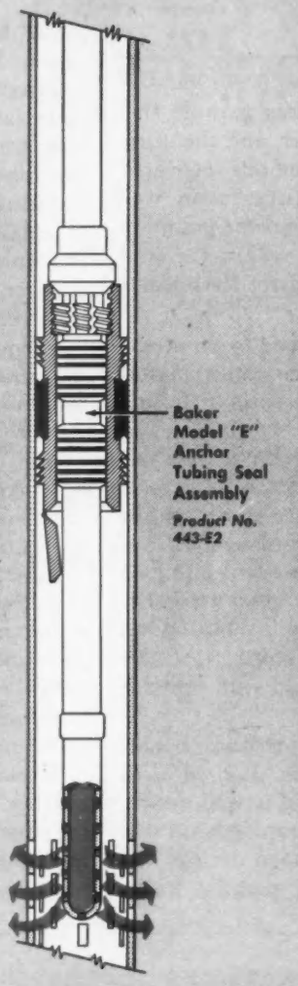
TUBING STRING IS ALWAYS "FREE"—That valuable string of tubing—whether 1,000 feet or 16,000 feet in length—can be removed by simply picking up the tubing weight.

EXCESSIVE "SET-DOWN" WEIGHT OR TENSION NOT REQUIRED—Even when squeezing, formation fracturing, or producing at any depth under pressure, a perfect pack-off is maintained independent of excessive set-down weight, or tension.

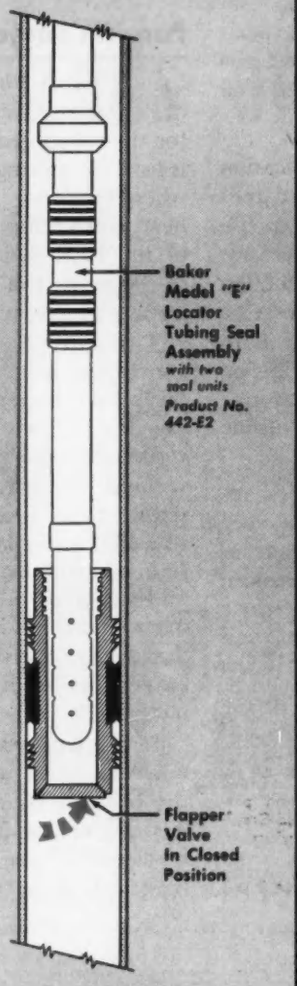
HOLDS PRESSURE DIFFERENTIALS FROM ABOVE OR BELOW—Two sets of opposed slips, and a resilient packing confined by lead and metallic sealing rings, effect a permanent pack-off that will hold any pressure differential *either from above or below the packer* that is safe for the well equipment.


Baker Model "E" Locator Tubing Seal Assembly with two seal units Product No. 442-E2
Baker Retainer Production Packer Product No. 415-D
Flapper Valve Open
Baker Type "F" Perforated Production Tube Product No. 457-F

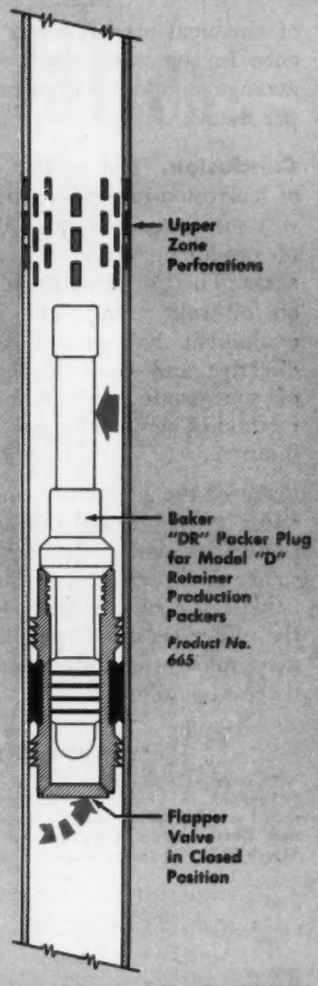
Washing or Circulating—Seals of Locator Tubing Seal Assembly removed from packer bore. Flapper Valve held open by tubing extending below the Packer.



Pressuring Below Packer—Acid or cement squeeze, formation fracture, gas or water injection. Anchor Tubing Seal Assembly is used when high squeeze pressures are required.



Isolate Zone Below Packer—Tubing String removed, Flapper Valve closed. Isolates pressure differentials (squeeze, production) from below the packer.


Upper Zone Perforations
Baker "DR" Packer Plug for Model "D" Retainer Production Packers Product No. 665
Flapper Valve in Closed Position

Temporary Bridge Plug—For working over zones above the packer. DR Plug is run in on Baker Retrievable Cementer and retrieved with overshot.

PACKS-OFF AND HOLDS UNDER HIGH BHT—Baker Retainer Production Packers will hold high pressures under conditions of high temperatures. Hundreds of Baker Packers are in successful service in Southwest and Gulf Coast areas where temperatures in excess of 300 degrees are not uncommon.

RESISTS CORROSION—The cast-iron used in the construction of Baker Packers is far more resistant to corrosion than the casing in which the packer is set, thus making it ideal for permanent installations, or for use in areas plagued with a severe corrosion problem.

EASILY DRILLABLE—The Baker Packer is constructed of drillable cast-iron, and its design supplements the breaking-up action of the bit. Whether it has been in the well for only a few hours, or for ten years, the Baker Packer can be drilled up in minimum time. Expensive and hazardous "milling-out" operations never are required.

IMPORTANT FACTS

Baker Packers are used in a majority of installations where conditions of extreme pressure, temperature, or depth are present. Baker Packers also dominate Dual Zone installations, particularly those involving two-packer, crossed-flow arrangements.

BUT IT IS ALSO TRUE that *more* Baker Packers are used for *simple single zone* completions than for *any other type of completion*, and that *most* Baker Dual Zone installations employ *only one* packer.

Ask any Baker representative, or office, for complete details. There is no charge, and no obligation, for specific recommendations and completion planning advice available from Baker Technical Advisers. Why not be prepared for your next completion?

BAKER OIL TOOLS, INC.

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If your well is worth completing . . . it's worth completing well

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RETAINER PRODUCTION PACKER

of chemical used is based on experience in the particular pool but the average is about 11 gallons per well per month.

Conclusion. The proper application of corrosion-mitigation procedures will substantially reduce the expense of producing crude oil in corrosive areas. The use of cathodic protection on oil-well casing and in treating equipment has proved to be both effective and economical. Inhibition of sour-crude wells is an effective method of combatting rod and tubing failures.

All of the procedures discussed require considerable attention and should be under the supervision of someone experienced in the corrosion field. Lack of attention will reduce the effectiveness of the program and may make the difference between success or failure.

ACKNOWLEDGMENT

This article is taken from a paper entitled "Corrosion in Production Operations" and presented at the Spring meeting of the Mid-Continent District of the API's Division of Production, March 23-25, Amarillo, Texas.

—The End

Paraffin Barge

Continued from Page 178

drical tanks. One is used to store fuel for the steam generator, and the other is used for storing waste oils recovered when bleeding pressure from well head connections to prevent pollution of the bays. Located within the hull of the barge is a 26-barrel fresh water storage compartment.

The water also is piped to the steam generating unit. These tanks permit several days operation without refueling.

On the bow of the barge are two vertical wooden lined steel bumpers spaced three feet apart to fit against standard well guards used by Gulf Refining Company. There are also two 16-foot spuds used to hold the barge in position on location. Located on diagonally opposite corners of the barge, they are operated with individual hand hoists.

In a typical paraffin treating operation the barge will be moored with the bow resting against a well guard. A string of paraffin scraping tools will be assembled on the open deck of the barge. These tools, paraffin knife, sinker bars and bumper jars, will be fastened to the reel of wire line and lowered into the well through a lubricator fastened to the top of the christmas tree. The paraffin deposited in the tubing is removed by raising and lowering the cutting knife by means of small gasoline engine-driven wire line hoist.

After the paraffin in the tubing is removed, steps are taken also to clean the flowline. Steam heat raises the temperature of the oil flowing through the flowline which, in turn, melts paraffin deposited on the internal walls of the flowline, thus permitting it to be carried on to the tank battery in the flow steam. This operation requires from one to four hours per well.

The frequency of individual flowline treating varies from two weeks to two months, depending on the well. Its importance is readily apparent as suspension of treatment would necessitate removal of the flowline for costly mechanical paraffin removal.

These steam generators are used also for degassing tanks prior to welding, for treating oil-water emulsions and for cleaning equipment to be painted. —The End

The HERCULES ECONOMICAL

"Type E" Casing Head with Slips

The Hercules "Type E" (for Economy) Casing Head was designed as an economical means of supporting and packing-off casing strings in wells of medium depth and pressure. It is made of electric cast steel and is tested to 3,000 pounds psi. It will safely support in excess of 50 tons of casing with a 2-to-1 safety factor.

The "Type E" Casing Head has the original Hercules overhead packing arrangement. The slips are hinged together, thus making them easy to install. Hold-tight notches are provided in top of packing nut to accommodate trimo wrench or pinch bar to screw it down into the head.

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"TYPE E" CASING HEAD WITH SLIPS

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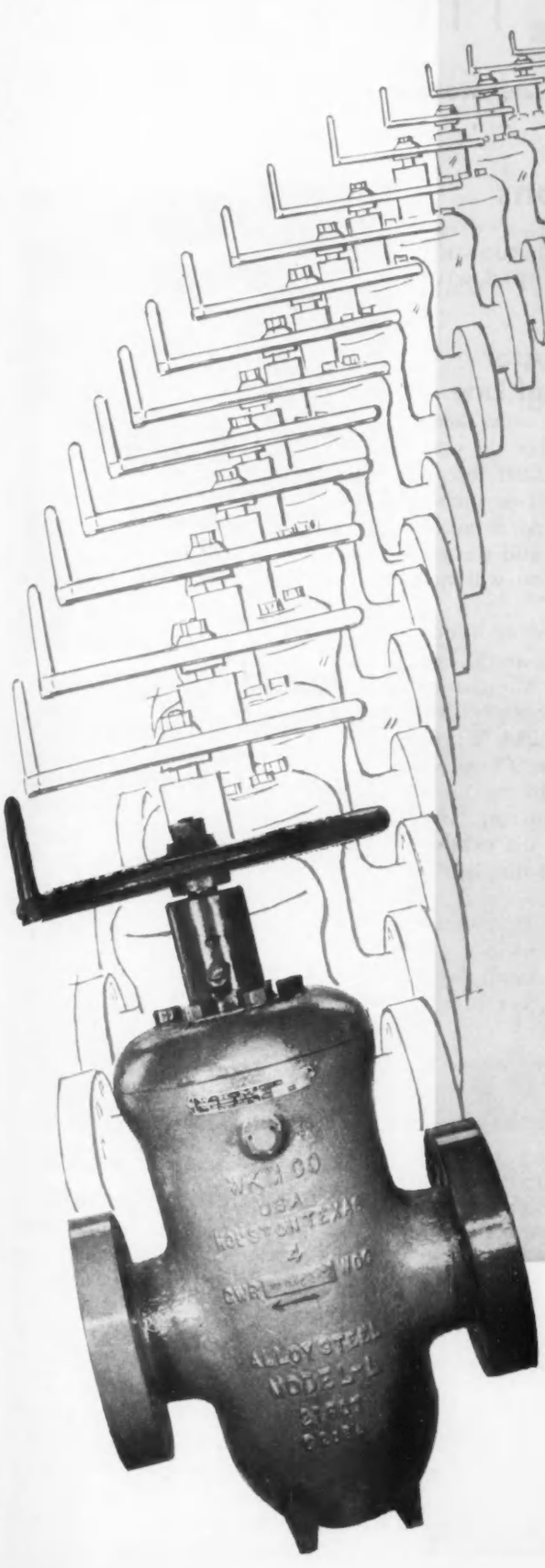

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21 years ago W-K-M introduced the first through-conduit valve and many of the first valves W-K-M made are still on the job. And today more than 80% of the high pressure wells in the U. S. A. are controlled by W-K-M through conduit valves. Some of the firsts which make W-K-M Valves so outstanding are shown below:

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How to do it

PRODUCTION HINTS

$10 is paid for each illustrated acceptable contribution. Mail to The Editor, WORLD OIL, P. O. Box 2608, Houston 1, Texas.

Pipe Jack Aids Small Line Connections

A compact, light-weight, three-piece pipe jack has proven successful in saving time and strained-backs, and in permitting better connections on small lines laid in the field. An invention of gangpusher A. J. Rousselle of The California Company's Delta Farms field in south Louisiana, the pipe jack is now in a "patent pending" status.

It consists of three pieces: the foot piece, the supporting leg and an adjustable pipe cradle. Two features are significant: the supporting leg fits into the foot plate at an angle of about 60 degrees from the horizontal; and a ratchet element in the cradle assembly permits the cradle to be raised or lowered on the supporting leg. It works something like a ratchet-type bumper jack.

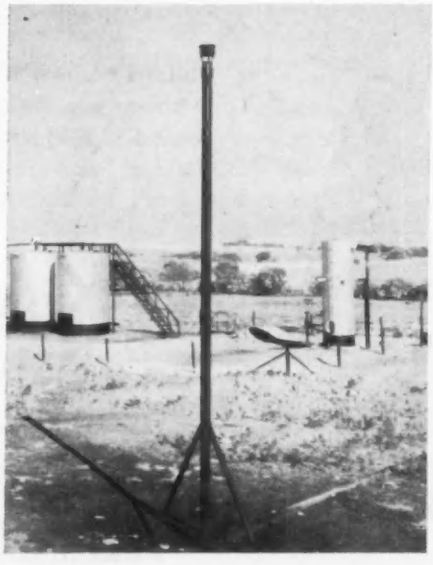
Roustabout crews have found it useful in laying flow lines where individual joints must be made up as the line is laid; in cutting and threading pipe in the field; and, particularly, in connecting lines equipped with flanged couplings.

Weld Thread Protector Close to Top of Vent Line

On flare lines in windy areas, keep the flame close to the end of the vent line by attaching a four-collar thread protector approximately two inches above the top of the vent. Air is mixed with gas before ignition, and the result is a blue flame which will not blow out.

The vent line, a joint of 4-inch pipe, is screwed into a tee at the end of the ground line. It should be braced. The flame arrestor is made by taking another short 4-inch nipple and welding 2-inch lengths of quarter-inch rods between it and the small end of a collar thread protector. This assembly is screwed into the existing collar on top of the vent line before the line is raised.

This device will also preserve the flame between heads of gas in a gas lift installation as even a small flame will burn inside the shelter of the thread protector.



Use Gate Hinge to Make Foot Pedal on Cleanout Rig

To facilitate changing engine speeds on a cleanout rig in bailing and spudding operations, run a separate shaft from the carburetor and make an automobile-type foot control. Use the usual hand control when a constant speed is needed; set it at idling speed when the foot accelerator is used.

For a pedal, spike one side of a gate hinge to the derrick floor. Fasten the chain from the gas throttle to the swinging end. Make an easily-removed connection at that end for easy rigging up and tearing down.

Make Side Seats for Crew On Pipe Pulling Machine

Side seats for the three-man crew on the tractor of a pulling unit can add materially to the safety of workover operations.

The two seats, which are on either side of the tractor behind the driver, are made of steel plate, with an expanded metal guard and rail around to protect the driver. The bottom section of the two seats hold tools.

The tractor also has a hitch for hauling fitting subs and other equipment necessary for workovers.

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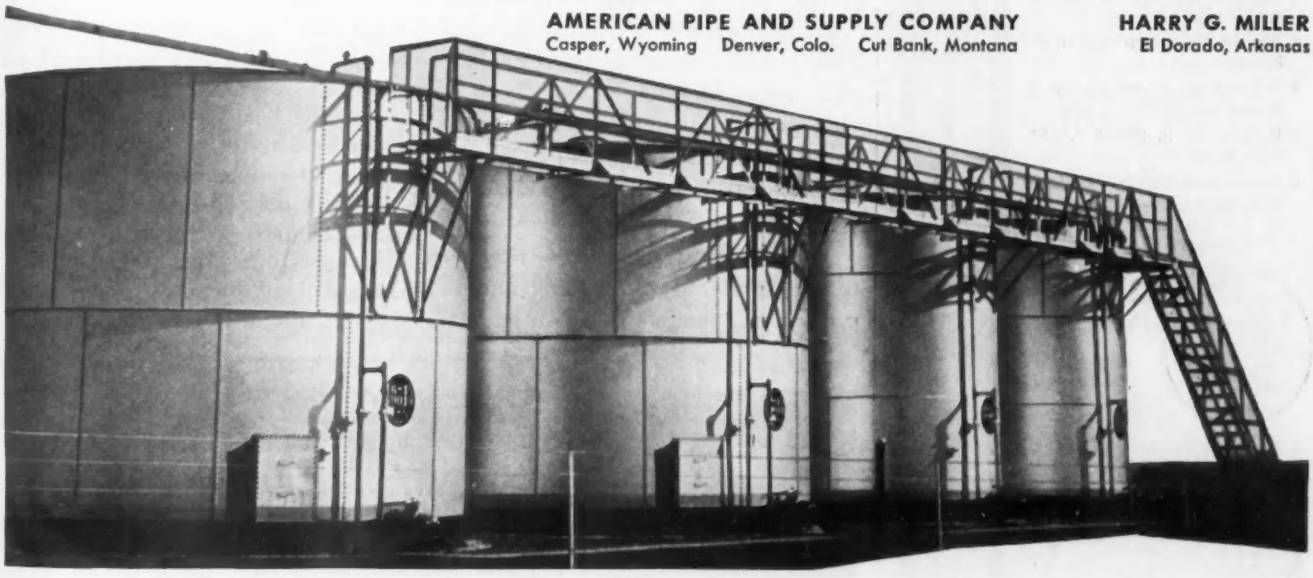

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A phone call to your nearby Butler distributor will start Butler tanks on their way to your lease. Depend on him for *quick action, fast service.*

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These improvements have resulted in perfect Triple-Spiral Spring-tempered Scrapers.

OTHER ADVANTAGES:

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- May be spaced for any stroke length.
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- Now in use in EVERY PARAFFIN AREA.
- Sizes available for IMMEDIATE DELIVERY — TO FIT ⅝" to 1" rods in 2", 2½", and 3" tubing.

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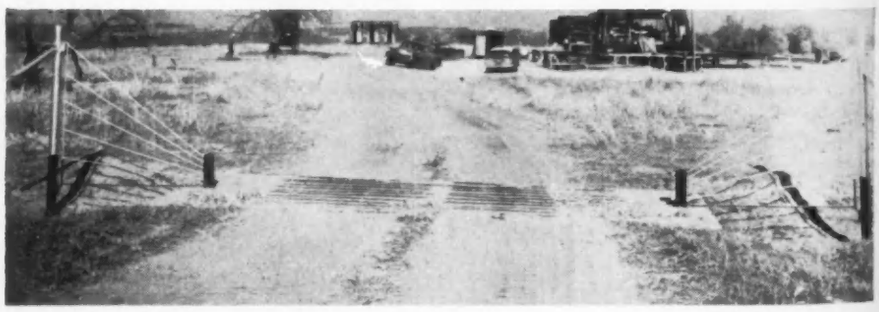
Rig Truck for Heavy Field Duty

A few shop-built additions will make a pick-up service truck capable of handling tough field jobs. To provide power for pulling and loading equipment, install a winch, driven by a power take-off, in the front of the bed.

At the rear, attach a heavy bumper to the frame to aid loading and to protect rear fenders in rough terrain. Weld clevices to the top of the bumper at each end to support gin poles.

Loading heavy equipment is made easier by a roller of 4-inch drill pipe, supported by bearings as shown.

Protect the cab by welding a stout headache post to the frame to provide a rest for long pieces of pipe. Oak planking protects the bottom and sides of the bed for heavy hauling.



Make Cattle Guard Frame Removable

In areas where substructures and even entire rig floors are moved between locations on trucks, fix the sides of cattle guards so the frames can be removed whenever necessary.

Set the posts approximately eight feet back from the end of the rails. Make the frames from sucker rod material, welded to a piece of 3-inch pipe. Top and bottom rods should have hooks which fit into ¾-inch pipe nipples welded to the side of the posts. Set the 3-inch pipe down over a short 2-inch nipple welded to the center rail near the end. To lift out the guard, pick up the entire frame and set it aside.

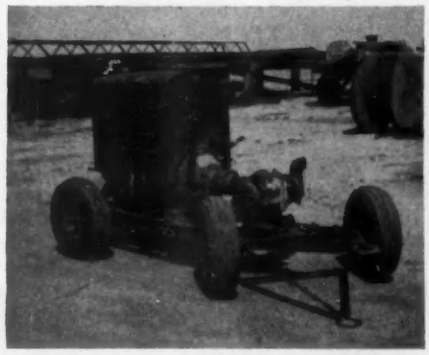
Oil Reservoir Lubricates Polish Rod

When pumping wells must be shut down several days out of each month to conform to allowable producing days, the packing glands in the polish rod stuffing box dry out. This is particularly true in dry, hot areas of the Permian Basin. When the well is put back on the pump again, gas which occupies the tubing above the fluid level, escapes through the shrunken packing element. As the oil reaches the surface, it, too, leaks out around the polish rod, leaving an unsightly mess and fire hazard around the well head.

Two short sections of different size pipe helped solve the problem for one operator. A funnel device was made by welding a short section of four-inch pipe to the blanked bottom of a short piece of 8⅝-inch casing. A hole was cut in the sealed bottom where the four-inch joined the larger pipe, making a sort of exaggerated swage nipple.

This device was then welded to the tightening element of the stuffing box assembly, as shown. Lease oil was then poured into this funnel device to provide a reservoir of oil in which the polish rod operated. The packing glands of the stuffing box were constantly lubricated, and even when the well was shut down, the packing elements were kept moist with oil. When the well was put back on the pump again, gas and oil did not leak out around the stuffing box.

Make Mobile Pumping Unit From Surplus Bomb Carrier



A highly maneuverable and versatile mobile rotary gear pumping unit can be made easily by utilizing a war surplus bomb carrier frame. It will save time and trouble in transferring small amounts of oil, pumping out cellars, etc.

Except for removing the bomb holder and burning holes in the frame so rotary gear pump and a four-cylinder gasoline engine can be mounted, no major changes have to be made in the trailer itself. Aside from welding and cutting operations, the only expense is approximately $90 for the purchaser of the bomb carrier at an army surplus salvage yard.

The unit can be towed to any lease location, and, when licensed, can be towed on the highway.

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The lower the expense of producing source water from wells for water flooding operations, the greater the ultimate profit.

Reda Pumps for source water wells provide many ways for lowering these production costs.

Improved design and longer operating life *lower* the cost of labor per barrel, *lower* the cost of maintenance per barrel, *lower* the investment cost per barrel, *lower* the cost of fluid per barrel.

Also the ability of Reda pumps to produce greater volumes in limiting casing sizes and from greater depths often reduces the number of source water wells required.

Reda engineers have long been associated with water flooding operations and are fully qualified to assist operators in discussing their source water requirements.

REDA
PUMP COMPANY
BARTLESVILLE, OKLA.

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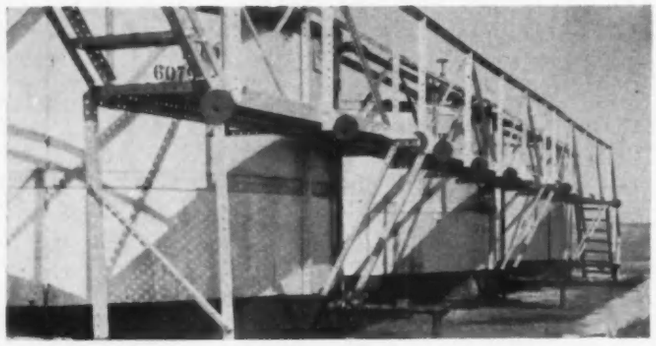

Colored Discs Used as Safety Warnings

Underside of tank battery ladders and walkways often present hazards at normal head level in the form of sharp corners, projecting floor supports and bracing ends. To prevent serious injury to workmen, one operator has adopted an effective and inexpensive protective practice.

Round discs, about five inches in diameter, are cut out of discarded canvas belting and a hole drilled or punched through the centers. Painted a brilliant color, the discs are bolted to the various projecting edges of ladders and walkways. Depending upon the protection, discs are installed in either a vertical or horizontal position.

In one of the photographs, a row of vertically-positioned discs, each flagging a sharp projection, can be seen. In the other, a horizontally-placed disc designed to prevent contact with the sharp corner of a horizontal projection is shown.

The brightly colored discs not only give sufficient warning of danger, but also, being semi-yielding canvas belting, prevent serious injury.

Long lasting, the discs are inexpensive, easy to install and worth the effort as a safety feature.

Steel Shavings Clean Gas In Engine Fuel Scrubber

A scrubber for cleaning engine fuel gas incorporates an automatic shut-downdown time clock on the fuel line. The scrubber is made from 10-inch pipe with an outlet line welded to the

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GOTKOOL Water Can — made in 1½, 2, 3, 5, 10, 15, and 20-gallon sizes without faucets. Extended or recessed flush-mounted faucets available at slight additional cost. *(Note: 15- and 20-gallon sizes available with extended faucet only.)*

GOTKOOL Water Cooler — made in 2, 3, 5, 8, 10, 15, and 20-gallon sizes with extended or recessed flush-mounted faucet optional. *(Note: 15- and 20-gallon sizes available with extended faucet only.)*

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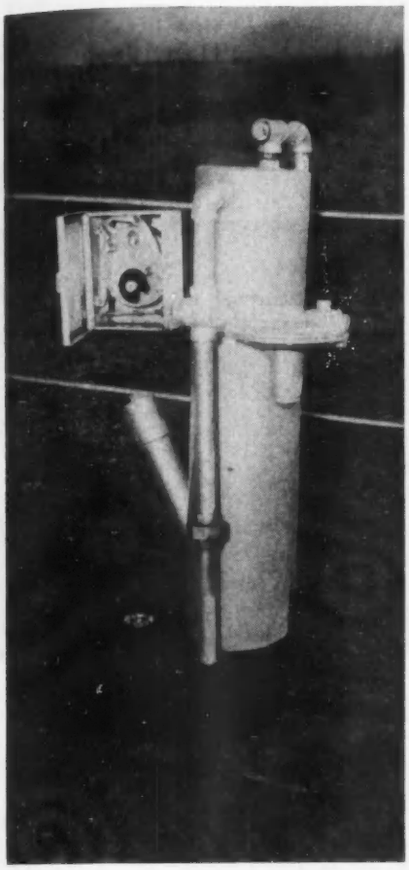


top. An inlet line welded into the side near the top extends to a point near the bottom.

Steel shavings are placed in the bottom of the vessel through a 2-inch nipple welded onto the side as shown. A drain connection is fitted at the bottom.

Gas fuel is cut off by the time clock on the gas regulator at a predetermined time.

Field-Fabricated Lowboy Aids Moving Small Tanks

A special lowboy which can be field-fabricated makes moving stock and small storage tanks a simple matter. This lowboy can be made from the back wheels of a heavy-duty bobtail truck and 4-inch pipe.

Weld the frame which supports the tank to the underside of the truck axle. Support the pipe framework that goes beneath the tank with two pieces of 6-inch pipe running the length of the trailer. Connect these, in turn, to a trailer hitch.

To load the tank onto the lowboy, tilt the tank and pull the trailer beneath it. During travel, a chain

(For more data on advertised products, use Readers' Service blue cards, last page this issue.)

ANOTHER TRIUMPH IN APPLIED PRACTICAL "IMAGINEERING"

Bringing the atom smasher TO

P.E.S.A. members venture their capital in basic research, so as to be ready with the solution of tomorrows oil industry problems:

Take the P.E.S.A. service companies for example. Here you can find atomic scientists working in laboratories that remind one of Los Alamos during the feverish rush to beat the scientists of the enemy in developing the atomic bomb. One of the many well-equipped laboratories has a van de Graaff accelerator, one of the family of atom smashers used by the Atomic Energy Commission and major nuclear research laboratories throughout the world for the study of atomic phenomena. This van de Graaff accelerator has an operating range of a million to 10 million volts. Many uses are foreseen for this atom smasher, but its primary use is as a source of atomic particles for precise and fundamental research in radioactivity well logging.

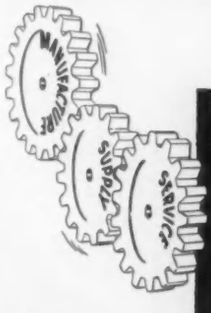
The van de Graaff instrument can produce a flux of neutrons as great as that which could be obtained from a neutron source using many grams of radium. Thus a machine originally developed to aid in the advancement of nuclear physics and atomic power will serve equally well as an instrument of progress in the oil industry.

By varying the kinds of ions that are accelerated by the built-up high potential and by varying target material which the ions are beamed to strike, it is possible to produce a great variety of nuclear reactions—neutrons, gamma rays, beta rays, protons, X-rays, or alpha particles. The neutrons and gamma rays are the ones most used in well logging at the present time.

Uses of neutrons and gamma ray curves: The gamma ray curve is a measurement of the amount of radioactivity that is natural in the formation penetrated by the bore-hole. The neutron curve is the measurement of the amount of fluid in the formation. It is obtained by bombarding the formation with a strong source of neutrons and measuring the induced radiation. These two curves, with a casing collar log, provide the complete radioactivity well log which indicates formation characteristics in either open or cased holes.

• • •

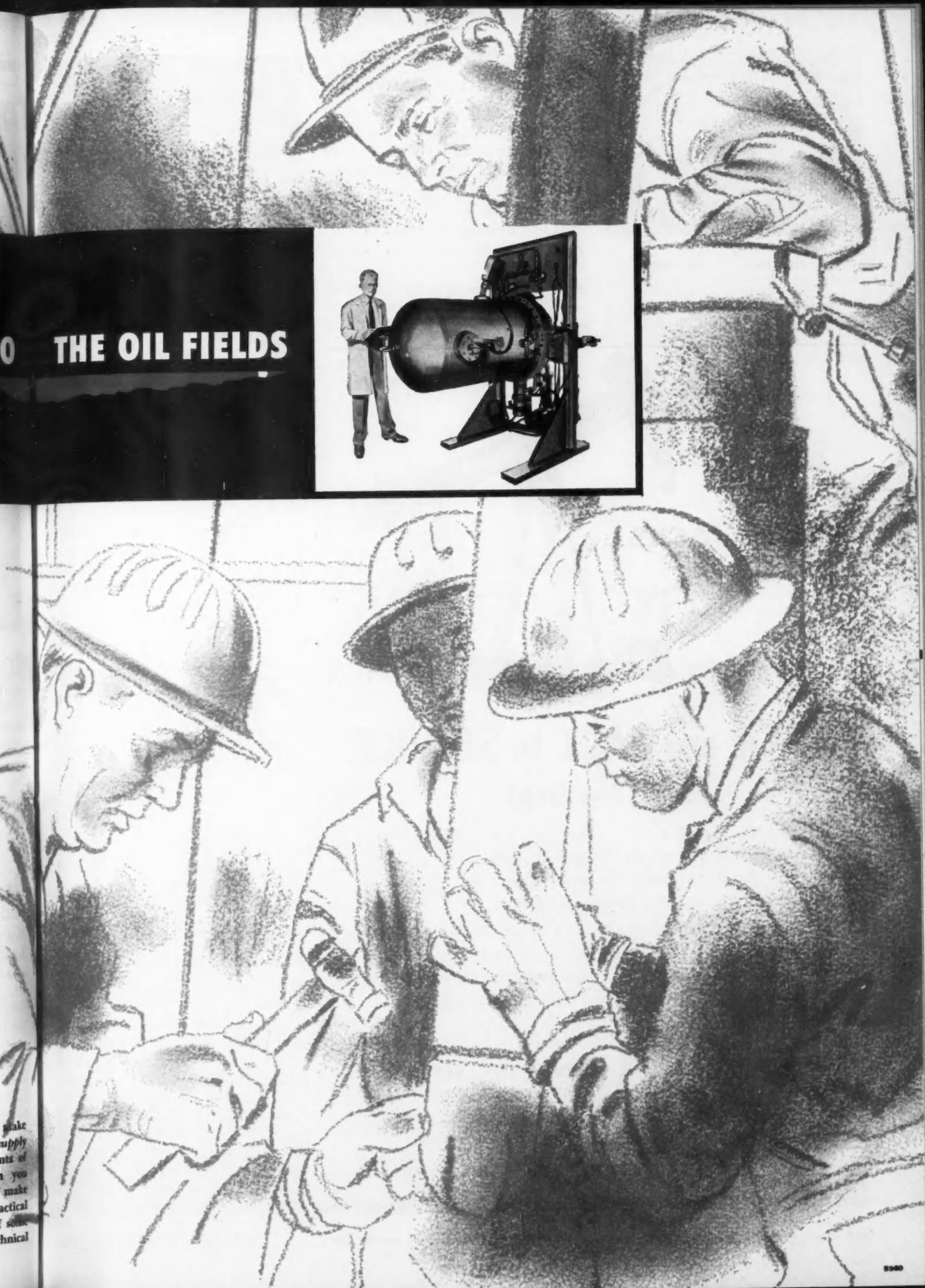
Truly, the petroleum equipment-supply-service business, more than any other, is one of applied practical "imagineering". It is a business where the Ph.D.s, the D.Sc.s, and the practical well men of P.E.S.A. mingle their skills with oil company men of like training—all for the advancement of equipment and techniques that assure a sufficiency of the life blood of industry . . . OIL.

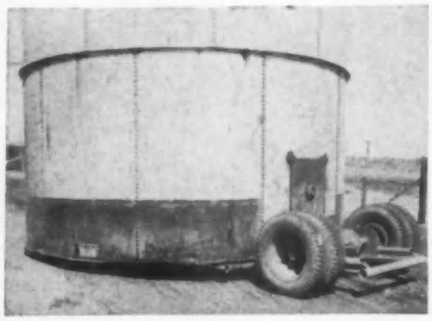


P.E.S.A.*

* Petroleum Equipment Suppliers Association

Composed of: manufacturers whose plants make the finest precision equipment . . . *supply stores* who add two other ingredients of value — where you want it — when you want it . . . *service companies* who make available to their customers the practical results of the theoretical research of some of the most brilliant scientific and technical men in the world.


O THE OIL FIELDS



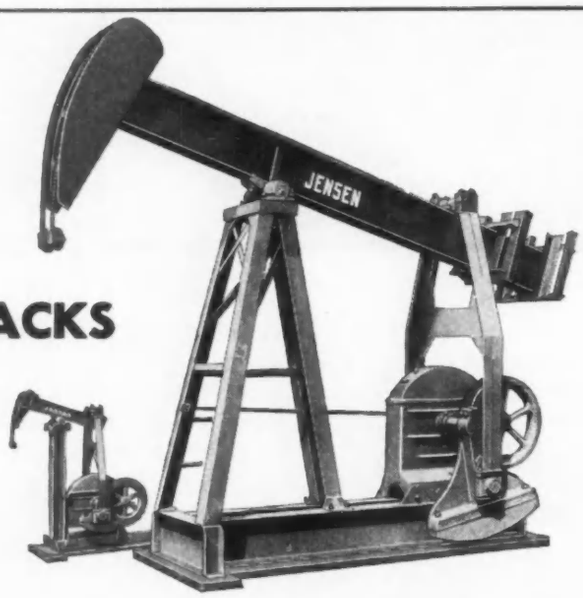
around the base of the tank will steady it.

Latching Device Simplifies Skim Trough Level Adjusting

Easy adjustment of the skimming pond intake trough can be built simply into the hand-operated winch unit. Instead of lashing with a line or attaching a dog to the hand wheel, hold the skim trough at the desired level by extending the 3-inch axle beyond the hand wheel and welding square-section bars at equi-distant points around it. Cut the dog out of

a piece of ½-inch plate and bolt it to one of the supporting legs so that it rides over the bars when the trough is winched upward, but falls in place and locks the axle when the hand wheel is released.

Depending upon diameter of the axle, and degree of adjustment desired by the operator, install the square lock bars as close together as necessary.



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Signed

Use Rubber Stamp Form To Record Engine Data

In taking pull cards on two-cycle engines, it is often hard to get each operator to list all information on back of indicator cards, and it requires time to write down each item.

To overcome this, a rubber stamp can be made up showing readings desired. Each entry can be filled in quickly after back of indicator card has been stamped. The completed card provides a good record to refer to in keeping two-cycle engines balanced.

BRITISH PETROLEUM NEARS 20th YEAR

Since exploration began in 1936, BP's prospecting subsidiary, D'Arcy Exploration Company, has drilled over a million feet and 507 wells.

THE BRITISH PETROLEUM COMPANY is approaching its 20th year of seeking and producing oil in Great Britain. Since exploration started in 1936, British Petroleum's prospecting subsidiary, D'Arcy Exploration Company, has drilled more than 1 million feet and 507 wells.

At present British Petroleum has about 230 producing wells in the country. Last year these wells yielded almost 440,000 barrels of oil. The three main centers of production are grouped in the Midlands, near Nottingham—in Eakring, Duke's Wood and Kelham Hills fields.

British Petroleum's latest field—the first important find in Great Britain since World War II—is at Plungar, about 20 miles from Eakring. The first test well struck oil at 2820 feet in October, 1953. Since then, seven more wells have been drilled. Of the eight, three are producing wells. Drilling of a ninth well is proceeding and preparations are being made to drill 10 and 11.

The country's first oil field was discovered at Eakring in 1939, and while this dome was being drilled up, refraction survey parties working south and east from Eakring established other domes at Duke's Wood and Kelham Hills. These domes were also found to contain commercially important quantities of oil.

Well spacing originally was planned to 500 feet, but to get maximum production during the war infilling wells were drilled, giving an over-all spacing of one well to two and one-half acres at Eakring, and one well to three acres at Kelham and Duke's Wood.

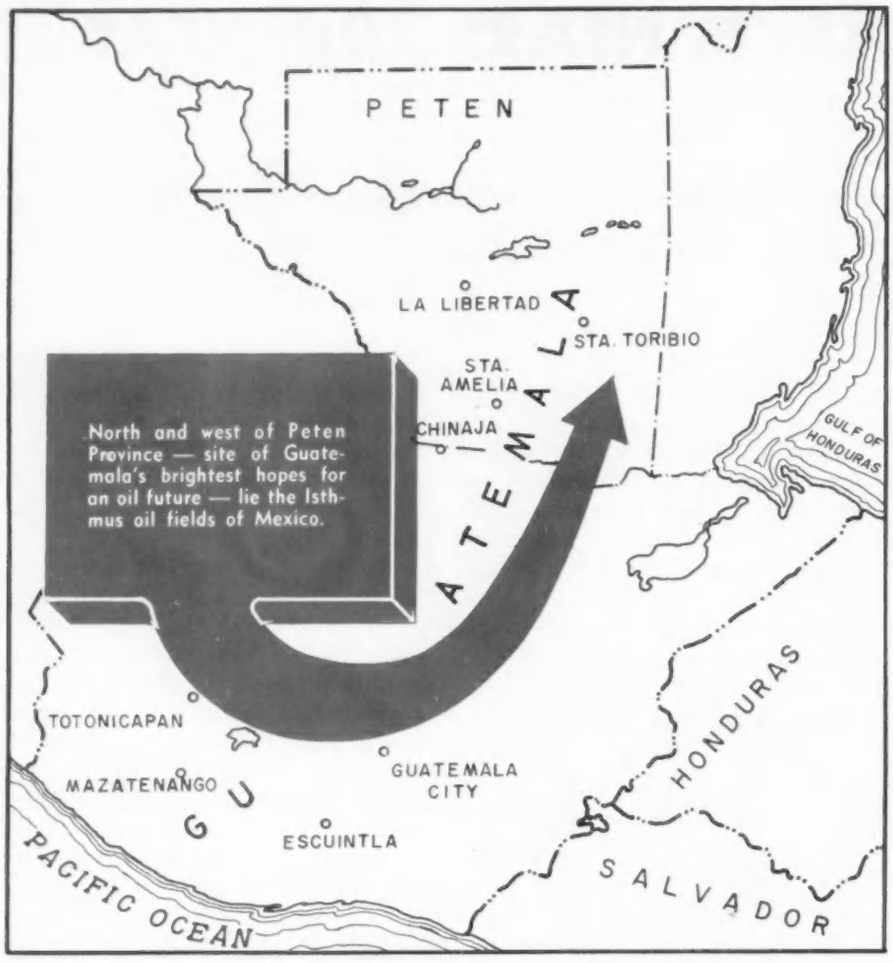
Initial well productions varied from about 8 barrels a day to an exceptional 375 barrels daily, the present daily average being about 5 barrels.

With production, there was a fairly rapid fall in pressure in the various sands and fields, and a consequent decrease in output. This decrease was compensated for partially by shooting, but near the end of 1947 water injection was started and subsequently all three fields were treated, resulting in a spectacular rise in production.

—**The End**

British Petroleum at a glance . . .

- **In 20 years, BPC subsidiary, D'Arcy Exploration, has drilled more than 1 million feet and 507 wells.**
- **BPC has some 230 producing wells. Last year these wells yielded near 440,000 barrels of oil.**
- **Three main centers of production are in Midlands, near Nottingham—Eakring, Duke's Woods, and Kelham Hills fields.**
- **Plungar, 20 miles from Eakring, is the first important discovery in Great Britain since World War II.**
- **Eight wells have been drilled in new fields. Three are producing. Drilling of ninth is underway. Plans being made to drill Numbers 10 and 11.**



Guatemala May Grant Oil Exploration Permits Soon

Completion of new petroleum code may lead to the granting of concessions late this summer or early fall, says New York consultant who helped draft the law.

GUATEMALA may grant the first exploration concessions late this summer or early fall, according to Sam Malis, economic consultant of New York City, who helped the government draw up its new petroleum code and laws.

Malis spent nine months of intermittent work in Guatemala City assisting Salvador Mendoza, adviser to President Carlos Ames, in setting up new laws governing development of the country's potentially-rich oil reserves.

Groundwork has been laid for the granting of concessions, but exploration permits will not be issued until the petroleum code and laws are made final by the government, according to Malis.

He has met with representatives of several oil companies in the U. S. which may be interested in obtaining concessions. He has advised them how to proceed in applying for these exploration and drilling rights.

Malis represents trustees of the Guatemalan development groups, which are charged with the responsibility of regulating the country's petroleum industry.

No oil wells have been drilled in the central American republic, but oil seepages and signs of natural gas have been reported in El Peten province near the southern border of Mexico. Some 22.5 million acres are possible oil producing, Malis said.

Several areas in the country have bright oil potentialities, according to Malis. El Peten province is southwest of a recent major oil discovery by Petroleos Mexicanos, the Mexican government's oil agency.

Malis cited some details of the new petroleum laws which will interest U. S. oil companies. Already several companies have sent representatives to Guatemala City seeking concessions. In fact, companies may submit applications for concessions which will be screened in preparation for later granting.

Two Guatemalan oil development groups are in charge of processing applications and assisting prospective concession grantees. An economic planning board, headed by R. Salazar, oversees all contracts let for concessions.

Exploration concessions will be issued for four years, giving the grantee the right to conduct any type of test to determine the presence of possible oil-bearing formations. During this period, the operator may drill wells, but he cannot market the oil, if found, until a development concession is granted.

The government will grant a development concession to the holder of an exploration grant any time the operator requests it, Malis said.

Exploration concessions will be 100,000 hectares in size, equivalent to 247,335 acres. Applicants may take as many as four concessions, or approximately 1 million acres. Exploration concessions may be extended two years upon application. At the end of the exploration period, the grantee must return half of the concession to the government which will become national reserves.

The grantee is obligated to spend 20 cents per hectare (2.471 acres) for exploration, and must post a $20,000 bond on each concession for this pur-

pose. Work must start within six months after the exploration concession is granted.

The grantee must pay a $500 filing fee for each exploratory concession, and is required to pay land taxes of 30 cents per hectare per year for the first two years; 60 cents per year for the third and fourth years, and 90 cents per year for the fifth and sixth years if granted an extension.

The grantee may deduct exploration costs up to two-thirds of his land taxes, Malis explained.

Development concessions are granted for 40 years, and may be extended 20 years. Royalties to the government and overrides for provinces and schools amount to 20 per cent.

A filing fee of $1000 is assessed for each development concession of 50,000 hectares, (123,550 acres) without reversion of any part of it to the government. Each grantee may obtain four concessions, and work must start within a year.

Land taxes are graduated from $1 per hectare per year for the first five years to $7.50 per year for the last 15 years of a 40-year concession. Land taxes during an extension period amount to $9 per hectare per year.

However, Malis explained, operators may deduct 75 percent of the amount of land taxes from royalties paid the government. Land taxes actually are paid only on undrilled acreage. For each well drilled, 200 hectares (494 acres) of land are exempt from taxes.

The government also has set up a depletion allowance of 23⅓ percent of the gross value of the operator's production, not to exceed more than 50 percent of the net profit. This allowance is given prior to payment of taxes.

The petroleum law also provides that during the first 20 years of development concession, the operator will not be required to pay import duties on equipment, machinery or supplies used in operations. The operator also may take equipment from the country at any time without paying export duty.

Malis said the Guatemalan government seeks to interest oil companies with technical know-how, financial responsibility, and good faith to develop its petroleum reserves.

—The End

What About Guatemala? . . .

EXPLORATION CONCESSIONS . . .

covering about 1 million acres may be granted each applicant. Grantee will have right to decide his own testing methods. BUT, no oil can be marketed without . . .

DEVELOPMENT CONCESSIONS . . .

which will be granted upon request for 40 years. They may be extended 20 years. Due on concessions will be . . .

LAND TAXES . . .

on a sliding scale basis. For each well drilled approximately 500 acres are exempt from taxes, according to government, which has set up a . . .

DEPLETION ALLOWANCE . . .

of 23⅓ % of gross value of operator's production, not to exceed more than 50% of net profit. Allowance given prior to payment of taxes.

CUBA IS 'HOT'

Since the Jatibonico discovery in Camaguey Province in May of 1954, Cuba has taken on increased importance in the international petroleum picture. Until May of last year Cuba was "cold." Today interest is intense. The outlook is bright. WORLD OIL *sent veteran Mid-Continent District Editor Anthony Gibbon to Cuba to get the story. He was welcomed at a luncheon before leading Cuban officials with these words: "Mr. Gibbon is representing the finest oil publication in the world. Whatever you gentlemen can do for him will assist us in Cuba who are trying to develop the island into an oil province." Here's his story, sizing up Cuba's lease play, drilling and touching on the efforts of a handful of hearty men, both Cubans and Americans, who have never lacked faith in the oil possibilities of the island.*

GIBBON

The island's oil play can be traced to three factors—1. A stable government. 2. Year-around working climate. 3. A currency that is freely convertible into dollars.

By ANTHONY GIBBON, WORLD OIL Staff

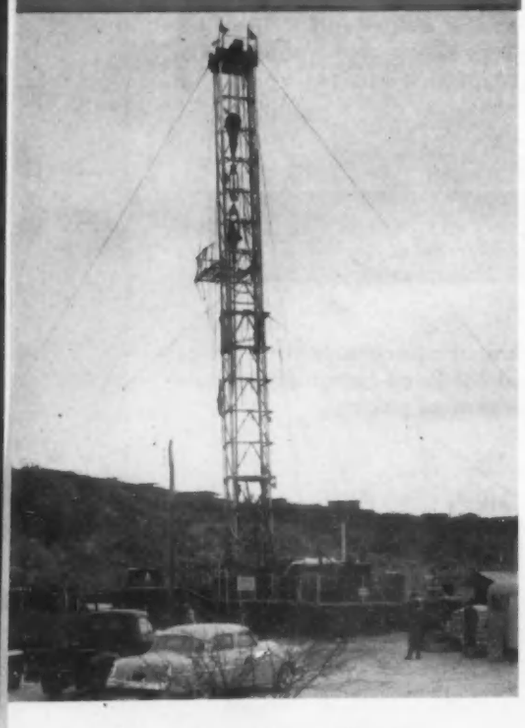
UNTIL THE DISCOVERY at Jatibonico in Camaguey Province in May, 1954, Cuba's oil prospects were dim. Now, although there are only a few more than a score of producing wells, most of which are in Jatibonico, and two new discoveries near old production in Havana Province, competent observes are optimistic for the future.

This optimism is reflected in the many deals which have been consummated during last year or so. According to Ing. Antonio Calvache, Director of Mines and chief Cuban oil official, concessions have been granted or have been applied for on all of the island's 44,000 square miles. Another estimated 15,000 square miles of offshore rights have been tied up.

Under Cuban law, the subsurface belongs to the nation and no exploration or development rights can be obtained, except through the government. With the exception of leases in Cuba's three older fields and where new production has been developed, all concessions are in the exploration stage. Hundreds of concession applications are being processed.

Royalty on oil produced is 11 percent of which 1 percent goes to the owner of the surface rights and the balance to the government. If the oil is refined in Cuba, government royalty is 9 percent.

Initial exploration concessions are for three-year terms during which the concessionnaire must conduct geolog-



Left above is scene at Ted Jones Drilling Company's Santa Maria del Mar 1, discovery well about three miles east of Bacuranao field. Left to right are: an unidentified Cuban army officer, Ing. Fidel Barreto, Cuban minister of agriculture; Ing. Antonio Calvache, director of mines and chief Cuban official in charge of oil affairs; Mrs. Lincoln G. Valentine; Lincoln G. Valentine, who pioneered oil search in Cuba, and Ted Jones (in white shirt) who drilled discovery well on concession acquired from Valentine. Left is Jones' Juanita 1, a significant wildcat test some 27 miles east of Havana.

ical and geophysical work. At the end of that time he may apply for a development concession which extends for 30 years and may be renewed for another 10 years.

The government is anxious to encourage oil exploration and, under certain conditions, will lend money to operators to drill. Government loans are up to one-third of the capital invested of which at least 90 percent must be used for exploratory work and drilling. Amortization terms are subject to each individual contract, but the loan carries 6 percent interest plus a bonus of 10 percent after oil is developed and production exceeds 1000 barrels per day gaged over a period of one month. When production has been established, the loan is repaid out of 20 percent of production.

Cuba's current oil activity was sparked with the completion in May, 1954, of Echevarria 1, on the 28,000-acre Estrellas concession in Camaguey Province, south-central Cuba, to open the Jatibonico field (WORLD OIL, July, 1954, Page 220). The discovery is about 25 miles southeast of the old Jarahueca field, and is located on the west limb of the Jatibonico-Ciego de Avila Zaza Basin, east of the Trinidad mountains and west of the Camaguey Uplift.

The well was financed by Cuban industrialists known as the "Grupo Jarahueca," headed by Dr. Antonio Iglesias and Sr. Sixto Mesa. The "Grupo" entered into an agreement with Kerr-McGee Oil Industries, Inc., Oklahoma City, Okla., to furnish drilling and technical personnel. Kerr-McGee retained an option to buy a quarter interest in the block. The option since has been exercised. The well was drilled with a rig owned by the Cuban government and loaned to the operators.

Echevarria well was drilled to a total depth of 8375 feet. It was plugged back and completed for 250 barrels per day of 15-gravity oil between 1072-88 feet from what is believed to be upper Cretaceous. This was the first commercial oil well in Cuba completed in sedimentary beds. Other Cuban wells produce from fractured serpentine.

As of June 1, 1955, 15 producing wells and three dry holes had been drilled in Jatibonico. Three additional wells were testing. Principal operators are the "Grupo"-Kerr-McGee and Cuban-Canadian Petroleum, a

Current drilling activity in Cuba . . .

TABLE 1

Province	Operator	Field or Wildcat	Rotary	Cable	Total Wells
Oriente					
Camaguey	Union Pet. Aurrera Jarahueca	Jatibonico	1		1
Camaguey	Inversiones Pet. Versailles	Jatibonico	1		1
Camaguey	Trans-Cuba Oil Co.	Wildcat	1		1
Camaguey	Cuban Canadian	Jatibonico	1		1
Camaguey	Cuban Colombian	Wildcat	1		1
Las Villas	Minera de Caridad, S. A.	Wildcat		1	1
Las Villas	Cuban Kewanee Oil Co.	Wildcat	1		1
Las Villas	Cuban Kewanee Oil Co.	Jarahueca	1		1
Las Villas	Minera Movima, S. A.	Wildcat		1	1
Las Villas	Minera Movima	Wildcat		1	1
Las Villas	Union Pet. Aurrera Jarahueca	Wildcat	1		1
Las Villas	Arabos Commercial Co.	Motembo		1	1
Las Villas	Herederos de Leon Otheguy	Motembo		1	1
Las Villas	Jose Uzuamintiaga	Motembo		1	1
Las Villas	Minera de Motembo	Motembo		1	1
Las Villas	Naftalifera Clorita, S. A.	Motembo		1	1
Las Villas	Petroleum Enterprises	Motembo		1	1
Las Villas	Rogelio Domingues	Motembo		1	1
Matanzas	Consolidated Astoria Mines, Ltd.	Wildcat		1	1
Havana	Perforadora de la Antillas, S. A.	Bacuranao		1	1
Havana	Petrolero Cruz Verde, S. A.	Bacuranao (stepout)		1	1
Havana	Salomon Oil Enterprises, S. A.	Bacuranao (stepout)		1	1
Havana	Ted Jones Drilling Co.	Wildcat	1		1
Havana	Morro Castle Oil Co.	Bacuranao		1	1
Havana	Salomon Oil Enterprise, S. A.	Wildcat	1		1
Pinar del Rio	Sierra-Fernandes	Wildcat		1	1
Pinar del Rio	Explotacion Minera Rio Seco, S. A.	Wildcat		1	1
			10	17	27

Source: Cuba Petroleum News Digest.

Comparison of concession terms and operating conditions in Western Canada and Cuba . . .

TABLE 2

POINTS UNDER COMPARISON	Province of Alberta	Province of Saskatchewan	Republic of Cuba
Maximum exploration acreage allowed to one entity	200,000 acres	250,000 acres	750,000 acres
Maximum exploration period	3 years	2 years	3 years
Guarantee deposit on maximum acreage	$25,000	$1000	None
Maximum exploitation acreage allowed to one entity	100,000 acres	250,000 acres	750,000 acres
Annual tax per acre	$1	First year: $0.50 thereafter: $1.00	First 10 years: $0.04 Second 10 years: $0.06 Third 10 years: $0.16
Percentage of acreage reserved by government in conversion from exploration to exploitation status	50% when converted from reservation to lease	40% to 60% depending on size of block	12½%
Exploitation period	21 years	21 years	30 Years (may be extended to 40)
Permissible extensions of exploitation period	21 years	21 years	60-day option to accept best third-party terms
Drilling obligations: Start of first well within	1 year	15 months	5 years
Start of further wells	90 days after discovery well. Gov't may demand more rapid drilling	Minimum yearly drilling exp. of $2,000 for every 1,920 acres	Every 5 years thereafter one well to 4,000' for every 60,000 acres
Royalties	12%	15% if production exceeds 200 b/d	11%

While the Jatibonico discovery has not been evaluated fully, some observers believe that it will develop into a major oil field

subsidiary of American Leduc Petroleums, Limited, of Canada. The oil is treated and sold to sugar refineries and other clients throughout Cuba.

Cost of drilling and putting a Jatibonico well into tanks is estimated at $15,000.

The rig which drilled the discovery well is being operated by Cuban-Kewanee Oil Company, a subsidiary of the Kewanee Oil Company of Philadelphia, Pa., on a concession of approximately 25,000 acres in Las Villas Province. The old Jarahueca oil field is on this concession, and Cuban-Kewanee, besides drilling a wildcat on this concession, is test drilling in the old field with its own tools. The Jarahueca field currently is producing 110 barrels a day, all of which is coming from old wells.

Until May of last year, Cuba was "cold" insofar as interest in oil was concerned, and its prospects of becoming a major oil producer were dim. Five major companies had prospected the island—Gulf Oil Corporation, Richmond Oil Company, Atlantic Refining Co. of Cuba, Shell Oil Company and Standard Oil Company (New Jersey) with no success. Until May of last year, only three small fields had been found. Motembo, the oldest, which produces naptha from 300 to 700 feet; Bacuranao, about 20 miles east of Havana, and Jarahueca. About 2000 wells had been drilled in Cuba up to the time of the Jatibonico discovery.

While the Jatibonico discovery has not been evaluated fully, some observers believe it will develop into a major oil field. Interest in the island is intense and the outlook is brighter. A number of substantial independents are in the picture. It is reported that at least 20 wells must be drilled this year to meet concession commitments. And there is a possibility that some 175 wells may be drilled altogether in 1955.

Behind this activity lie the dreams and efforts of a handful of men, both Cubans and Americans, who have never lacked faith in the oil possibilities of the island.

Lincoln G. Valentine was the pioneer who went to Cuba from Venezuela some years ago to, as he explained, "rest up." He became interested in the oil possibilities and, on advice of Florent H. Bailly, formerly with the Pantepec group in Venezuela, in 1948 and 1949, formed the Cuban-Venezuela Oil Company and acquired 15.5 million acres of oil concessions in the basin areas of Zapata, Central or Jatibonico, and Oriente Cauto. Later, he interested Warren W. Smith who, with Valentine and Bailly, formed the Cuban-Venezuelan Oil Voting Trust as a management group for companies which had been formed to hold the concessions. Since then, Valentine, while retaining certain interests, relinquished management to Smith, who now is chairman and who negotiated some of the contracts.

Valentine, in August of 1954 in association with William B. Duce of California and with the advice of Bailly, formed a similar group of companies headed by Petrolera Perla Negra de Cuba, acquiring approximately 1.5 million acres of oil concessions spread over the island. Recently, the company entered into an agreement with Ted Jones of Los Angeles, Calif., for one of the concessions on the northern coast of Havana Province comprising 23,000 acres. Later, Jones acquired rights on another concession nearby and drilled his Santa Maria del Mar 1, which was completed last April for an estimated 75 barrels of 26-gravity oil. This was the first discovery after Jatibonico.

The well is approximately 25 miles east of Havana and about five miles east of the old Bacuranao field. Jones drilled to 3475 feet. Jones said a sloughing hole prevented the producing liner reaching bottom, and it is set at 3377 feet. Production is from fractured serpentine, and Jones says 142 feet of pay is exposed. The well is equipped with pump, but flows intermittently. Other shows in this well were logged at 1214, 2728, 2800 and 3200 feet.

More significant is Jones' Juanita 1, about 2½ miles east of the Santa Maria del Mar. This well cut sedimentary beds and reports good saturation in sand sections between 2100-2200 feet, with no evidence of serpentine. A good show was also logged at 650 feet. The well will be drilled to between 4200 and 4500 feet. If successful, it will mark the first sedimentary production in northern Cuba and will establish existence of a sedimentary basin where production can be expected from sands instead of serpentine.

Location of both wells is ideal. They are only a few hundred yards from the paved highway and from the sea and near a well-known bathing beach. Crewmen live in beach villas and enjoy the comforts and scenery for which tourists pay substantially.

Another significant wildcat is Cuban-Canadian's test on the Dos Estrellas concession about three miles west of the Echevarria 1. The well was spudded in the Tertiary and was still in Tertiary at 4500 feet. This compares with only 1100 feet of Tertiary sediments in the Echevarria well. Porous sands interbedded with shales indicate thick sediments exist with the lithology similar to that of the Gulf Coast areas.

CVOVT has made several deals which will have an important bearing on oil exploration activities in Cuba. One of the most important was with Trans-Cuba Oil Company, which entered into a contract with Cuban-Venezuelan last November, where, by spending $3 million for exploration Trans-Cuba was to get a 50 percent working interest in the whole picture. Trans-Cuba drilled the Jucaro 1 in Camaguey Province to 3703 feet, reporting a slight show of gas. The rig was moved to Algodones, also in Camaguey Province and drilled to 4315 feet with a slight show of oil and gas reported at 1100 and 3924 feet. This well is about 20 miles southeast of the Jatibonico field and has been temporarily abandoned. Trans-Cuba plans to drill ten wells, and is now drilling its third well near Sancti Spiritus with no significant developments to date.

Cuban-American Drilling and Exploration Company, headed by Grady Vaughn, Tevis Morrow and Herbert

Offshore operations . . . CVOVT has farmed out to Cuban-American concessions covering 1.5 million acres. Extensive seismic work is now under way

Klein of Dallas, took a farmout from Cuban-Venezuelan on 750,000 acres in Las Villas, Camaguey and Oriente provinces and drilled a well to 5280 feet which reported some oil shows. The well is near Arroyo Blanco about eight miles northeast of the Jatibonico field. Cuban-American has done extensive seismic work and has located its second well east of Jatibonico, and was scheduled to start drilling in June.

Offshore, CVOVT farmed out to Cuban-American concessions covering 1.5 million acres on a nine-month drilling option. Extensive seismic work is underway on this large block.

In the Zapata Basin area, CVOVT farmed out two concessions comprising 150,000 acres to the Sulgraves-Cuban Petroleum Company, which agreed to drill two 10,000-foot tests, one on each block.

Besides these, the following deals are reported:

• Cuban-Canadian Petroleum Company of Cuba acquired a half interest in the Dos Estrellas (Jatibonico) concession, as well as extensive concession rights scattered throughout the island, including offshore rights. This company, which has an active drilling program in the Jatibonico area, plans to drill at least 20 wells.

• Deep Rock Oil Corporation and Sterling Oil of Oklahoma, Inc., entered into a joint exploration and development program on approximately 5.2 million acres of concessions covering four separate blocks. The deal was made with Caribbean Petroleum Associates, Inc., representing a group of eight Cuban companies.

Deep Rock and Sterling have selected approximately 2.6 million acres and are committed to drill 36,000 feet of hole, 9000 in each of the four blocks. Upon completion of at least 36,000 feet of hole, the companies comprising Caribbean agree to convey to the operators title to an undivided one-half interest in the selected acreage.

• Cuban-Columbian Petroleum Company, organized by Cuban sugar mill owners in partnership with American capital, acquired development rights on approximately 860,000 acres of which some 778,000 acres are in Matanzas and Las Villas Provinces. The company plans to drill at least six wells, and completed its first well, Norita 1, at 4505 feet with no shows. Norito 1 is west of Jatibonico.

• Petroleos Aurrera and Minera Movima, S.A., have oil rights above 4000 feet in 112,500 acres of a Gulf Oil concession near Placetas, Las Villas Province. Their Broderman 1 was abandoned at 2600 feet and they now are drilling two additional wells. Aurrera sub-contracted to Minera Movima, S.A., a block of 2500 acres and Movima, using cable tools, plans at least three wells to 2000-2500 feet.

• Consolidated Astoria Mines, Ltd., New York City, acquired a checkerboard half interest in a 60,000-acre concession on the north coast of Matanzas Province and is drilling a shallow test. Company officials state no information is available at present.

In late May, drilling was going ahead at 800 feet with water still not cut off, and future plans undetermined.

Major oil companies, although they have been in Cuba for years, have had no success yet.

Gulf spent an estimated $5 million since 1946 in exploration and drilling on 750,000 acres of concessions located offshore on the northern coast of Matanzas, and in Las Villas and Camaguey Provinces. In 1951 it drilled a well to 11,218 feet which is the deepest well ever drilled in Cuba. It was an offshore test located off Matanzas Province. In 1953 Gulf relinquished its 750,000 acres and acquired a like amount of new concessions inland in Las Villas Province. Current exploration program is core drilling 3000-feet holes. It is understood Gulf plans a deep test in central Las Villas Province.

In October, 1954, Richmond Petroleum, now California Exploration Company, acquired most of the concessions which Gulf released along the northern coast.

Between 1930 and 1946, Atlantic drilled eight dry holes in Matanzas, Pinar del Rio, Havana and Camaguey Provinces. Atlantic did considerable seismograph work which, spokesmen said, was unsatisfactory due to lack of stratigraphic information. They released the majority of their concessions but retained a one-third interest in Cia. Las Estrellas, the other two-thirds belonging to Shell.

Standard Oil of New Jersey reportedly owns a one-third interest in Shell's stock interest in this company. Cia. Las Estrellas has concession rights both on and offshore on the north coast of Las Villas and Camaguey Provinces. Since Echevarria 1 well, Atlantic has actively re-entered Cuba. With Cia. Las Estrellas, it is conducting geological and seismograph studies on this company's concessions, and it is reported a deep test is planned. Atlantic separately is renewing its acreage position on the north coast and is understood to have applied for large concessions in Pinar del Rio Province.

Between 1930 and 1947, Shell drilled 12 dry holes in Havana, Matanzas and Camaguey Provinces. Inactive since 1944, Shell is carrying out seismograph work along the north coast from Sagua la Grande in Las Villas Provinces, to Moron in Camaguey Province, with reported plans to drill the aforementioned test jointly with Atlantic.

Between 1942 and 1949, Jersey Standard drilled 10 wells in Pinar Del Rio and Matanzas Provinces. In 1946, it discontinued exploration. In 1951, it made Cuba its marketing headquarters for all the Caribbean area. Since the Echevarria 1 discovery well and the new activity, Jersey Standard has reopened exploration offices in Cuba and has three geologists on reconnaissance. The company's current holdings are understood to be its participating interest in Cia. Las Estrellas.

Recent geological investigations indicate that southern basins offer best

Pipe lines . . . there are no large facilities in Cuba now . . . they could be built quickly and easily should developments justify them

oil possibilities. Source rocks, reservoir rocks, structural traps, and possible depositional traps can be expected there.[1]

Subsurface geology is extremely complex and generally consists of north-south gravity faulting and tilting imposed upon older east-west trending folds and thrusts with their accompanying shears. Transverse folding is limited to regions that have suffered repeated complex deformations. There are several broad domes, and several anticlines show closure.

Cuban rocks are Pre-Jurassic metamorphics, Mesozoic, Tertiary and Quaternary sediments, with acid and basic intrusives and extrusives of different ages. Several Jurassic, Cretaceous and Eocene and Oligocene sediments offer possible source rocks, and good reservoir rocks may be found in some Cretaceous and Miocene sediments and in some fractured igneous bodies.

Dr. Jorge Broderman y Vignier, dean of Cuban geologists, says geological structures and conditions similar to those in Mexico are found in Cuba; that is, in the provinces of Pinar del Rio, Matanzas, Las Villas and Camaguey, part of the marine formation of the Upper Jurassic and Lower Cretaceous, which corresponds to oil producing formations, are the same in Mexico as in Cuba. The Laramide Revolution produced the same tectonics in the provinces of Pinar del Rio, Havana and probably part of Matanzas, at the end of the Maestrichtian deposition and later in Las Villas and Camaguey, with fluctuating sedimentation continuing in certain regions until the end of the Lower Miocene, the period in which general erosion of the island took place.

Until Jatibonico discovery, oil production in Cuba had been limited to serpentine and serpentine contacts. It appears that potential sedimentary reservoirs, including the Aptychus limestone (Lower Cretaceous) and younger sandstones exist at depths less than 7500 feet.

Before Jatibonico, Cuba had only three oil fields:

- Motembo field—about 20 miles northeast of Colon in Las Villas Province.
- Bacuranao—about 20 miles east of Havana.
- Jarahueca—about 10 miles north of Cabaiguan in Las Villas Province.

Oldest and most productive was Motembo, which had been depleted but is being extended. One of the most unusual fields in the world, Motembo produced a light naptha fuel that could be mixed with other gasoline in the fuel tank of a gasoline engine. Published data on this field indicate that it was producing as early as 1881, although production records extend only as far back as 1934. Naptha is obtained from the pockets in fractured serpentinized basic intrusives at depths ranging from 300 to 2000 feet. Approximately 1500 wells have been drilled in Motembo, and before the current new activity averaged about a tenth of a barrel per well per day.

The island is attractive for oil exploration. The climate makes year around operations easy in contrast to the weather problems encountered in such places as Canada and the Rockies. The government of Cuba is relatively stable and there has never been any threat of expropriation. In addition, the country's currency is freely convertible into dollars.

Table 1 is a comparison of concession terms and operating conditions in Western Canada and Cuba.

If substantial oil reserves are found, the economic situation of Cuba and its location in relation to the East Coast of the United States would assure a ready market for the production. Cuba has to import about $30 million worth of oil annually. Included in this figure are about 9000 barrels daily of crude imported from Venezuela and the U. S. and refined in Cuba for domestic consumption.

Venezuelan crude oil costs in excess of $3 a barrel laid down in Cuba, based on the average field price in Venezuela, transportation costs, and a 60 cents a barrel import duty. It is anticipated that a comparable price could be obtained for similar quality crude produced in Cuba.

There is a large potential market for fuels, such as petroleum products or natural gas, which Cuba is eager to supply domestically. Heavy fuel, in particular, should find a large market as the country now burns as fuel in sugar refineries large amounts of bagasse which could profitably be turned into newsprint and other products. A domestic supply of petroleum products would be of great value to the Cuban economy, which has always been uncomfortably dependent on sugar.

In addition, Cuba is only 120 miles from the east coast of Florida. Cuban crude could serve the whole Atlantic Coast more economically than any other producing region. Cuban crude also would be of great importance to the U. S. in time of war.

There are two refineries operating in Cuba. Standard's-Sinclair's Belot plant near Havana, capacity about 8000 barrels, and a small Cuban refinery at Cabaiguan, capacity about 1000 barrels per day. Standard plans to spend $20 million enlarging its Belot refinery and increasing its capacity to 30,000 barrels daily or more.

The Texas Company announced plans to build a 20,000 barrel daily capacity refinery at Santiago de Cuba in Oriente Province.

Shell reportedly is considering building a 30,000-barrel-daily capacity refinery in Cuba, and the small plant at Cabaiguan operated by Refinadora Cabaiguan, S.A., is being enlarged.

While there are no large pipe line facilities in Cuba, they could be constructed quickly and easily should future oil developments justify them.

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REFERENCE

[1] Report by Oil Properties Consultants, Inc., Pasadena, Calif., under the direction of Dr. Rene Engel.

ACKNOWLEDGMENT

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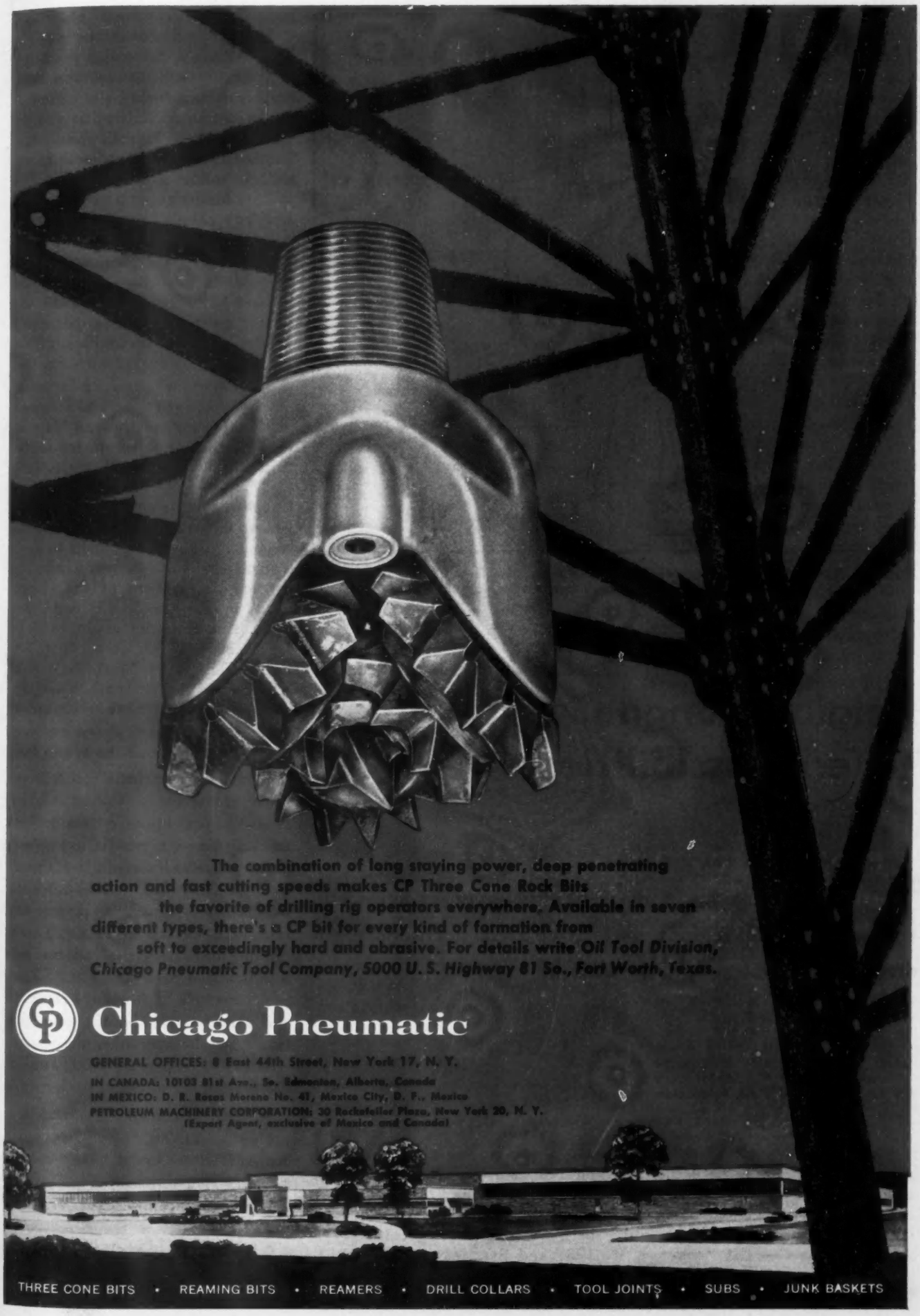
—The End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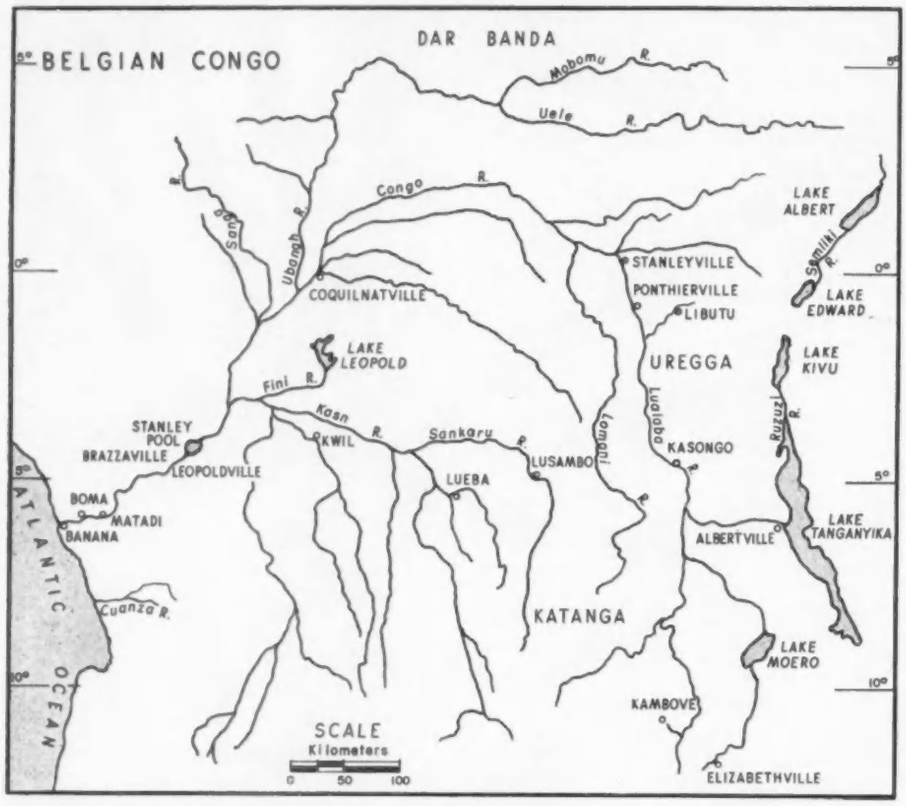

FIGURE 1—The mighty Congo River meanders through tropical rainforest to encompass almost all of the Belgian Congo country's four topographic areas.

Belgian Congo Geology Offers Possibilities

Great basin of a mighty river encompasses four topographic regions, with three areas accorded highest petroleum category in the section.

By H. W. STRALEY III, Consulting Geologist,
Princeton, West Virginia

LITTLE KNOWN AREAS are almost universally assumed to be extraordinarily rich. The Belgian Congo is no exception—explored but unknown; rumored to be the site of untold wealth.

Diego Cam found the mouth of the Congo River in 1482. Missionaries, explorers, and traders came in through the back door—the Nile Valley—late in the last century. Mineral concession came within a few decades of the advent of Livingstone (1854-1873) and Stanley (1871-1877). Today, there are two petroleum concessions: one on the coastal plain, the other in the interior basin (Hedburg).

The great basin of the mighty Congo River encompasses nearly all of the country. There are four topographic regions, exclusive of surrounding mountains: Dar Banda, on the east, is entirely French; the Congo-Zambezi plateau, to the south; and the rift valleys to the east (see Figure 1). A narrow plain of Cretaceous and Tertiary sediments borders the Atlantic Ocean.

Inward from the plain and pierced by only one gap—the Congo—lie the Crystal Mountains. Even the sole inlet is insecure, for the great river is ponded above Leopoldville to form Stanley pool.

From the pool upriver for many miles, the mighty stream follows a meandering course through impenetrable swamps and jungles of the tropical rainforest.

Rift Valleys. A chain of mountain-locked lakes marks the great fault zone. Lake Kivu is drained to Lake Tanganyika by the Ruzuzi River. The Lukuga, an affluent of the Congo, heads in Tanganyika. Ruwenzori, Africa's mightiest mountain, holds its head above 16,000 feet where few have seen it clearly. Northwest of Lake Kivu are active volcanoes associated with faulting, whereas Ruanda-Urundi, to the east, slopes eastward to the headwaters of the White Nile.

There has been little recent deposition in the basin (Cornet). It appeared in post-Miocene time through the warping of a post-Cretaceous peneplain. Reelevation, by a minimum of 3280 feet, followed by dissection has produced the present terrain. End-Tertiary, Tanganyika-rift faulting tore away the eastern and south-eastern part. The Congo-Zambezi plateau is a remnant of the old peneplain, so flat for 460 miles that water may flow to either the western Atlantic Ocean or eastern Indian Ocean.

All four standard American eras are represented. The lowermost Karoo beds are found to be near the bottom, enclosing the Dwyka, and correlative with Lower Beaufort (Permian). The age of the Kundelungu has been controversial: Karoo to Cambrian to pre-Cambrian.

Of the four subdivisions of the pre-

Cambrian, Kundelungu is youngest. Extensive and intensive diastrophism preceded it, leaving age relations of other divisions in doubt.

Both early glaciations (pre-Cambrian and Dwyka) covered much the same area and ice followed similar paths. Originating within the tropics, glaciers moved southward to the Cape and northward past the equator. The Lukuga (Ecca and Beaufort) formation, 656 feet thick, consists of shale and coarser clastic material (Cambier). Dwyka lake fill, 373 miles along the strike, is often 492 feet of black shale.

The Lukuga was followed by Appalachian east-west diastrophism. Most of the Dwyka was eroded soon thereafter, except where down faulted (Veatch). In some of the fault troughs, Lower Triassic beds accumulated (Stanleyville, Buta, and Casange, Angola), sometimes as oil shales (Mouta).

Lubilash (Upper Triassic) fanglomerates bear out other indications of aridity. The topography upon which they were laid had a relief of 650 feet (Riche). There was a progressive extension of the surface from east to west and an accompanying westward shifting of the source, as earlier elevations were surmounted.

The Mount Bonza beds may be Jurassic (Fourmarier) or Oligocene (Veatch). At any rate, Cretaceous and Tertiary rocks cover the narrow coastal plain.

C is the highest category accorded any part of the Belgian Congo, on the modified Reeves (Reeves) classification. Areas with this designation are coastal plain, Stanleyville basin, and rift valleys.

Coastal Plain (C_1). There are two parts to the coastal plain. The smaller lies near the mouth of the Congo River. The other, continuous with Angola, appears near the Cuanza River. The writer believes this is the most promising part of the region.

Source and reservoir rocks are at hand. Paleocene sandstones and limy sandstones interfinger. The environment under which such rocks were deposited is suitable for petroleum genesis. Near the base of the Cretaceous is another sandstone.

About the Author

H. W. STRALEY III has served the International Bank and the Foreign Economic Administration in evaluating mineral resources abroad. He has studied law, mathematics, geology, geophysics and related fields at the Georgia Institute of Technology, Oklahoma University and the University of North Carolina. Besides government work he has been engaged as a consultant in fuels, metals, and non-metal resources. He is now engaged in electrical, geological, gravitational, magnetic, mineral resource, radio-active, topographical and valuation surveys.

Seeps are common. In Angola, they are farther from the coast, but the plain is wider. Bitumen-saturated sandstones may be found at Dande, Mussera and Shitanga.

Interior Basin (C_1). Marine connection for the Stanleyville basin may be found to the northeast. The formation is sapropelic with more than a dozen bituminous layers out cropping between Ponthiersville and Stanleyville (see Table I). Their oil content decreased toward the middle, but is of the order of 20 or 26 barrels per metric ton (Pirson). Both conglomeratic and calcareous rocks, dipping about 13 feet per 0.6 mile, abound.

Structural conditions are such that a number of traps are present. The floor upon which the Karoo was laid down had a relief of 650 feet (Riche); it is 5900 feet thick; compaction folding and stratigraphic traps may be numerous.

Rift Valleys (C_1). Upon the Lubilash, lie Kisegi (Oligocene) and Kaiso (Miocene) formations (Wayland). The former, with sandy and conglomeratic facies was made in shallow, brackish water. Saline and shaly deposits in both indicate a potential petroliferous environment. Sands and conglomerates could yield it, once formed and migrated.

Other indications are found. All formations dip lakeward with abundant folding and faulting. There are innumerable unconformities on the up-dip edges. The unconsolidated Kaiso (the uppermost formation) may have sealed numberless faults and potential seeps. Nevertheless, seeps are common on both Congo and Uganda sides of the frontier.

Igneous and/or anamorphic rocks cover most of the remaining areas. Elsewhere, Karoo (not Stanleyville) and Kundelungu outcrop. Neither set of conditions is propitious for oil.

TABLE I

Geological Column, Stanleyville Basin

Sandstone	Bituminous layers at bottom
Red argillite	Bituminous shales
Argillite-Green shale	Bituminous layers of great area
Sandstone	Bituminous shale at top: conglomerate at bottom
Calcareous formation:	
Colitic limestone	250 meters thick; dip 20°-25° south
Middle member	75 meters thick; dips south
Lower member	325 meters thick; dip 20°-25° south; folds
Conglomerate & red sandstone	
Basal Complex	

Source: Pirson, *AAPG Bull.*, 18, 1934.

REFERENCES

Cambier, R., 1930, Contribution a l'etude geologique des bassins houilliers de la Luena, *Ser. des Mines*, Comite Special de Katanga, 1, 64.

Cornet, J., 1594, Les formations post-primaries du Bassin du Congo, 866. *Belg. Geol. Paleon. et Hydr.*, 2, Memoirs, 1893-1894, 193-279.

Fourmarier, P., 1930, Carts geologique du Congo Belgo.

Hedberg, H. D., 1953, 1952 developments in foreign petroleum fields: Africa, *Bull. A.A.P.G.*, 37, 1648-1684.

Mouta, F., 1943, Sur les formationes continentales du Bassin de Congo, *Soc. Geol. France*, O. R. Somm. des Sciences, 62-64.

Pirson, S. J., 1934, Oil possibilities of Belgium and Belgian Congo, *Bull. A.A.P.G.*, 18, 1170.

Raw, M. De, 1923, Les Gisements dismantiferous de Kasai, *Rev. Univ. Mines*, ser. 6, 18, 406.

Reeves, F., 1946, Outlines of regional classification of oil possibilities, *Bull. A.A.P.G.*, 30, 111-115, modified.

Riche, W. Le, 1932, Sur les pramiers fossils decouverts au nord de L'Angola dans le pronenguement des couches de Lubilash et sur le synchronisme des couches due Lubilash ot des couches de Lualaba, *Acad. Sci. Paris*, O. R. 195, 298-400.

Veatch, A. C., 1936, *Evolution of the Congo basin*, G. S. A. 163.

Wayland, D. J., 1946, Petroleum in Uganda, Uganda Geol. Surv. *Memoir* 1, 65.

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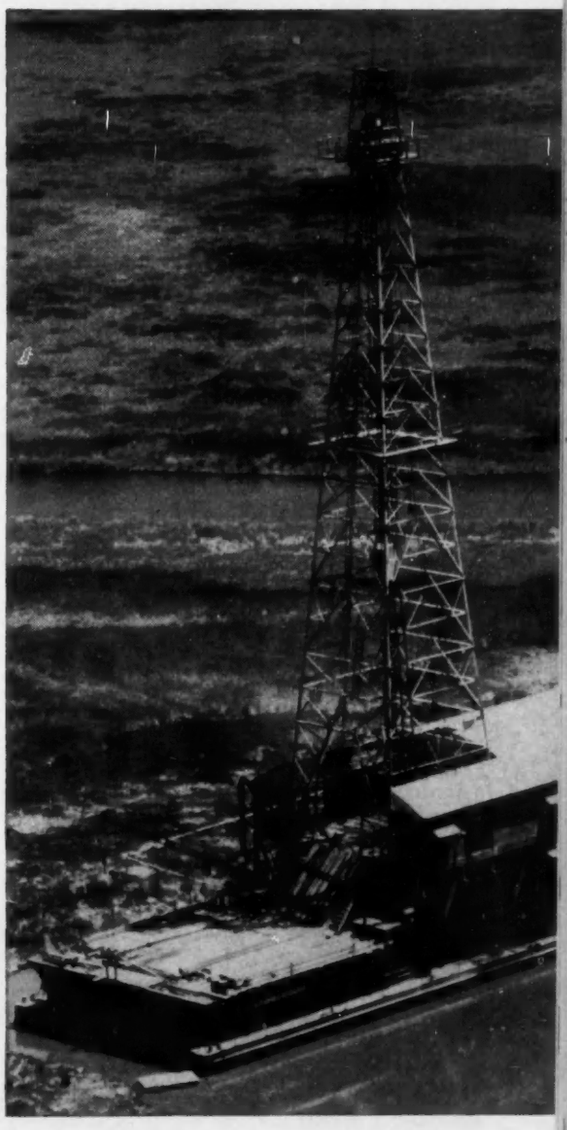

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What's Happening

AMONG WORLD OIL MEN

Canadian Group Elects Officers

Officers of the Calgary chapter, Oilfield Technical Society for 1955, are, left to right, front row: D. T. Magee, California Standard Company, secretary; D. A. Schmeeckle, Shell Oil Company, vice president; L. C. Stevens, Socony-Vacuum Exploration Company, president; E. E. Cudby, California Standard, treasurer. Back row, left to right: R. F. Cummer, McColl-Frontenac Oil Company, Ltd., chairman of program committee; and J. Menneer, Anglo-American Exploration Ltd.; C. W. McDaniel, Shell; J. Peach, Commonwealth Drilling Company; and A. T. Tidwell, Oil Well Supply, program committee members.

GUS A. STANDISH, formerly drilling engineer, Gulf Coast division, Magnolia Petroleum Company, Houston, has been transferred to the Colombian Petroleum Company, Cucuta, Colombia, as drilling superintendent. Standish joined Magnolia in 1947 after graduating from Texas A. & M. as a petroleum engineer. He was assigned to South Texas until 1948, when he was transferred to the Kermit district as petroleum engineer for West Texas and New Mexico. In 1949, he went to Lake Charles, La., in drilling and production operations, and was assigned to the Gulf Coast division in 1951.

Gus A. Standish

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C. R. BICKEL has been named manager of Shell Oil Company's newly formed Production division at Regina, Sask. Other appointments to the new division include R. K. PETTIGREW, exploitation engineer; D. C. NELLIS, mechanical engineer; G. R. T. HEANEY, reservoir engineer, and H. B. GRIST, purchasing-stores supervisor.

Los Angeles Nomads Honor Visitors

Recent guests at a meeting of the Los Angeles Chapter of Nomads are, standing left to right, C. R. Devine of Drilling and Exploration, Iran; D. S. Pitkeathly, The British Petroleum Company, England; Pat Docksey, British Petroleum, England; G. W. Drenthen, Royal Dutch Shell, Holland; D. H. Nations, Arabian American Oil Company, Saudi Arabia; C. A. Stoddard. Sitting, left to right, are Jim Worsdall, Venezuela; C. C. Smart, D & E, Brazil; W. J. Chancellor, D & E, Iran; George Burke, Dunlap & Graham, Uruguay; H. M. Heath of Colombian Petroleum Company, Colombia; and J. A. Wirtensohn, Asiatic Petroleum Corp.

Personnel changes made recently by Creole Petroleum Corporation are:

T. S. BURNUM, named supervisor, General Engineering Section, Caracas, during vacation of G. A. McCammon; G. BETANCOURT, appointed labor relations supervisor, Amuay; ROBERT BLAYNEY, named acting supervisor, industrial relations group, Lagunillas district; MALCOLM G. BAKER, named supervisor of the Interpretation sub-Section, Geophysics Section, Geological department, Caracas; PETE CINCOTTI, transferred as Salary section supervisor from Quiriquire to Caripito.

LYLE HARRISON, transferred as Training supervisor from Quiriquire to Caripito; RICHARD MONNIN, named supervisor of the Employment and Development section, Industrial Relations department, Caracas; ROBERT REYNOLDS, transferred as salary supervisor from Amuay, Western Venezuela, to Quiriquire, Eastern Venezuela; A. O. SETTAR, named joint interest coordinator, Production department, Caracas; GEORGE STUART, transferred as salary supervisor, from Caripito, Eastern Venezuela, to Amuay, Paraguana Peninsula; D. E. WALDEN, named supervisor, Training section, Industrial Relations department, Caracas; and J. L. WORTHINGTON, named coordinator of Fuels and Lubricants, Production department, Carcacas.

•

JACK C. PETERSON has been named industrial relations supervisor of the Canadian division of Stanolind at Calgary. Peterson formerly was Stanolind's Rocky Mountain division industrial relations supervisor in the Casper, Wyo., office.

•

R. A. WALTERS, former division exploration manager for Imperial Oil Limited in Canada, has been appointed general manager of the International Petroleum Company, Ltd., Colombian affiliate with headquarters in Bogotá. E. C. BORREGO, who formerly occupied Walters' new post, will take charge of International's interest in affiliated companies in Colombia.

Why Do Soviets Want to Pull Out of Satellite Oil Firms?

- **Reports indicate that the USSR is "willing" to sell to Rumania, Hungary and Bulgaria its share in the satellites' oil agencies.**
- **Western circles believe the decision to have a two-fold purpose—political and economic.**
- **A propaganda move to impress the West and underline the "sovereignty" of the satellite countries is suspected.**
- **From an economic standpoint, the need to concentrate oil products is not so pressing since USSR seems sufficiently saturated with crude and products.**

By **DON KLIEWER,** World Oil Staff

Reports received in Austria say that during October, 1954, the Soviet government informed the government of the Rumanian Peoples' Republic that the USSR was "willing" to sell its share in all joint Soviet-Rumanian industrial enterprises to the Rumanian state. Among the enterprises to have been scheduled for sale was the SovRum Petrol and the SovRum Petrolifer Utilaj.

Rumania had not yet actually purchased the stocks and shares of the SovRum enterprises. In doing so later, it will have to pay the Soviet Union for Soviet "capital" and Soviet "investments." The capital brought into the SovRum-Petrol was either former German External Assets (property handed over to the Soviets under terms of the 1945 Potsdam Agreement) or dismantled German equipment and tools.

The Rumanian part of the "capital" included the nationalized undertakings of the Rumanian oil industry outside of the German holdings, primarily U. S., British, Dutch, and French property.

As to "investments," the SovRum Petrol is known to have received from Russia oil field equipment, engines, tools, and trucks. These investment goods were paid for with SovRum Petrol profits, stemming from the Soviet (German) and Rumanian (Anglo-American) capital.

In Hungary, the Soviets decided at year's end to pull out from official participation in Hungarian industry. In a message to the Budapest government, the Soviets offered the immediate sale of all stocks and shares to the Hungarians. As in Rumania, no date had been set for the official changeover of property and no price had been set. Among the Soviet holdings in Hungary, the Meszhardt (oil trust), a state monopoly, was to change hands insofar as Hungary will be sole owner of the enterprise after purchase.

The reason underlying the Soviet decision to sell foreign assets is believed in Western circles to be twofold: political and economic.

By sale of Soviet business shares in Rumania, Hungary (and also Bulgaria), the Soviets apparently want to underline the "sovereignty" of the countries known as the Soviet "satellites." This comes as a propaganda measure intended to impress the West, an international chess table move to simulate conditions and purposes other than the official Stalin-Lenin line.

With heated discussion going on in West Europe about sovereignty of nations and mutual safety and economic systems, the Soviets apparently deemed it good to stress the opposite in their own zone of influence.

While on the surface the Soviet move appears very beneficial, bighearted and aimed at complete freedom, the fact that detachments of the Soviet army are still stationed in Rumania, Bulgaria and Hungary (officially to insure a safe line of logistics to the Red army units in Austria) still gives the Soviets enough excuses to stay in any of these countries.

Aside from that, the "brotherly" help of the Soviets (by delegations of experts) still obtains, though in reduced volume. These experts are, however, not only serving as "teachers" in the major industrial units of these three mentioned countries, but also act as "observers" and "reporters" to their government. In that sense, the pulling out of the Soviets is, politically, a maneuver.

From the economic viewpoint, one fact serves as the basis: the need to concentrate oil products (as "strategic reserves") in the Soviet Union is not so pressing any more now that the USSR seems to be sufficiently saturated with crude and products.

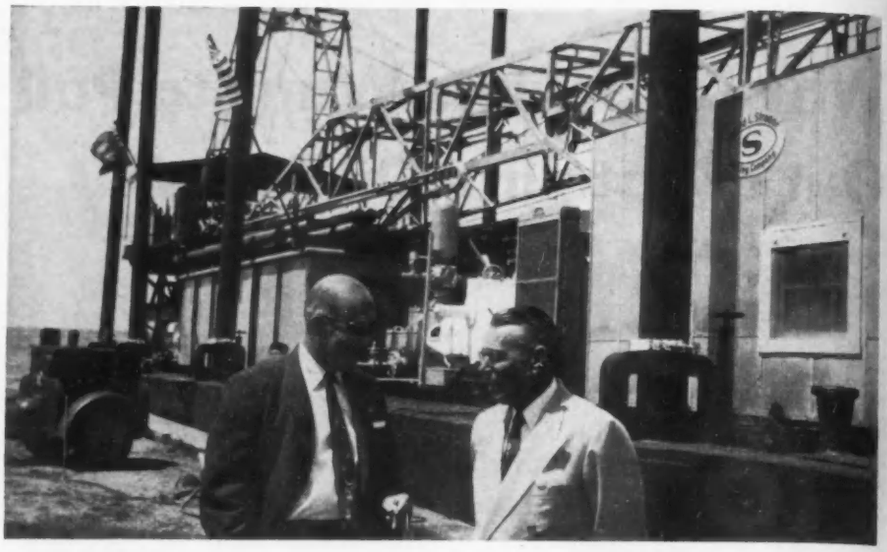
Military-minded as is the Soviet economy, exports on an almost worldwide basis would not have been permitted had not a certain oil storage level been reached during earlier years. From that it follows that the Soviets

apparently do not believe that as much effort is necessary under present conditions to partake in actual production. Instead of being a partner in industrial production, the Soviets have the easier way of writing up trade agreements to get exactly the material they want or need.

It is a widely known "secret" that not one of the Soviet satellite oil production plans was fulfilled during 1953, despite sometimes considerable increases in output. With the Soviets taking part in the exploitation and processing work, part of the responsibility for the shortcomings goes directly to the Soviets. This condition apparently is to be changed by switching all property—and all responsibilities—to the specific country's industry.

In Czechoslovakia and Poland, where small oil industries exist, no Soviet business partnership ever existed officially. There was no report that any change in the status of these industries would be made. Along the same line, Albania was not mentioned in the last three weeks' reporting on the economic switch. In Albania, the Soviets are still holding the majority of the important business enterprises in their hands. There was no announcement that changes are anticipated. It might be that the presence of Red Navy units permanently stationed off the Albanian Adriatic Sea coast makes necessary an even supply of oil products, a supply item sufficiently important to keep the Soviets managing this industry there.

All in all, economic circles in West Europe say, the Soviets have lost nothing by the attempted sale of their shares in Rumania, Hungary and Bulgaria. If and when a settlement of German Foreign Assets should take place (a revision of the specific Potsdam Agreement provisions) these countries will be called on to foot the bill, not the Soviets. If anything goes wrong in production, processing or marketing of products, the national governments are held responsible for any non-fulfillment of the trade agreement deliveries. Aside from that, the Soviets apparently think that they have written another page in the book of freedom; actually, they are trying to erase some pages from their postwar record. —**The End**



Harold L. Strader (left), drilling contractor for Canada's first offshore drilling barge venture, visits with Max Prather, general superintendent for John Mecom, independent oil operator of Houston, Texas, at the recent ceremony at the assembly point of the drilling barge Lake St. Clair (background) near the first drillsite in Lake St. Clair, Ontario.

Canada's First Offshore Barge Test Is Readied

Lake St. Clair Gasfields, Ltd. was preparing to spud its first well early in June on an 87,000-acre block located along the south shore of Lake St. Clair, which lies northeast of Detroit, Mich., south of Lake Huron and north of Lake Erie.

Production will be sought from the Guelph-Salina formation of Silurian age from 2200-2500 feet, and from the Trenton lime (Ordovician) expected at 2900-3400 feet. Both formations have produced onshore in the vicinity. At least ten offshore exploratory wells to test five or six gravity anomalies are planned. Lake St. Clair is on trend with the Cincinnati-Findlay Arch gas fields.

The operator is a Toronto syndicate headed by Dr. J. D. Bateman, C. C. Huston, former president of the Canadian Institute of Mining and Metallurgy, and A. E. Johnson, a mining and geophysical engineer, will direct drilling operations.

Contractor is Harold L. Strader of Houston, Texas, an engineer formerly associated with John W. Mecom, Houston independent oil operator, for whom he designed and supervised the construction of four drilling barges. The barge, Lake St. Clair, is 122 feet long, 32 feet wide, and has an 8-foot draught. It carries a rotary rig capable of drilling to a depth of 5000 feet. The barge can operate in about 20 feet of water, which would enable it to operate five miles offshore in Lake St. Clair. On location, it is partially submerged and secured in place by eight 80-foot steel spikes driven into the lake bottom.

The barge traveled from Houston along the Gulf Coast, up the Mississippi into the Illinois river, through the Chicago ship canal, through Lake Michigan, Lake Huron, and down the St. Clair river into Lake St. Clair. In order to allow clearance under Chicago's low bridges, the superstructure and mast were not erected until destination was reached.

Texas Firm Is Granted Permit by British Guiana

McBride Oil and Gas Corporation, San Antonio, Texas, has been granted a license by the British Guiana government to conduct offshore oil exploration in a 4000-square-mile area of the Continental Shelf.

The license calls for a well to be drilled to a minimum of 10,000 feet, unless oil or basement is reached above that depth, within one year, and the carrying out of a government-approved seismic program prior to 1957. If oil is found, the corporation will be entitled to a lease on half of the area. Such an allocation will be made on a checkerboard basis, allowing the government to negotiate leases with other oil companies.

Photo courtesy Geophysical Service Inc.

Going Down Under

This drill truck, part of a Geophysical Service Inc. shipment for a geophysical crew operating in western Australia, is eased into place on the deck of the Gjertrud Bakke, docked at San Francisco. The truck is part of the first of three shipments to Australia by GSI for a field party operating in the Freemantle area.

Socony Will Explore For Oil in Portugal Venture

Socony-Vacuum Oil Company, Inc., recently signed an agreement in Lisbon, Portugal, under which it will direct Portugal oil exploration as contractor with a participating interest in the benefits of a Companhia Dos Petroleos de Portugal concession.

The latter company is principally owned and financed by the Portuguese government and the Axel Johnson interests of Stockholm, Sweden.

The Socony-Vacuum venture will be conducted in the name of the recently-formed subsidiary, Socony-Vacuum Exploration Company, with offices in Lisbon.

Two Magnolia Petroleum Company men will head up the new company. They are L. H. Porter, Dallas, manager, and F. E. Wimbish, Midland, chief of exploration. Magnolia is the southwestern affiliate of Socony-Vacuum.

Jersey Standard Begins Sicilian Oil Search

Standard Oil Company (New Jersey) and private Italian capital have formed a company to undertake exploration for oil near Catania and Augusta in Sicily. The Sicilian Regional Government has issued three-year permits covering 215,000 acres to the firm.

The new company, Augusta Ricerche Petrolifere, S.F.A., had scheduled its first test well in Sicily.

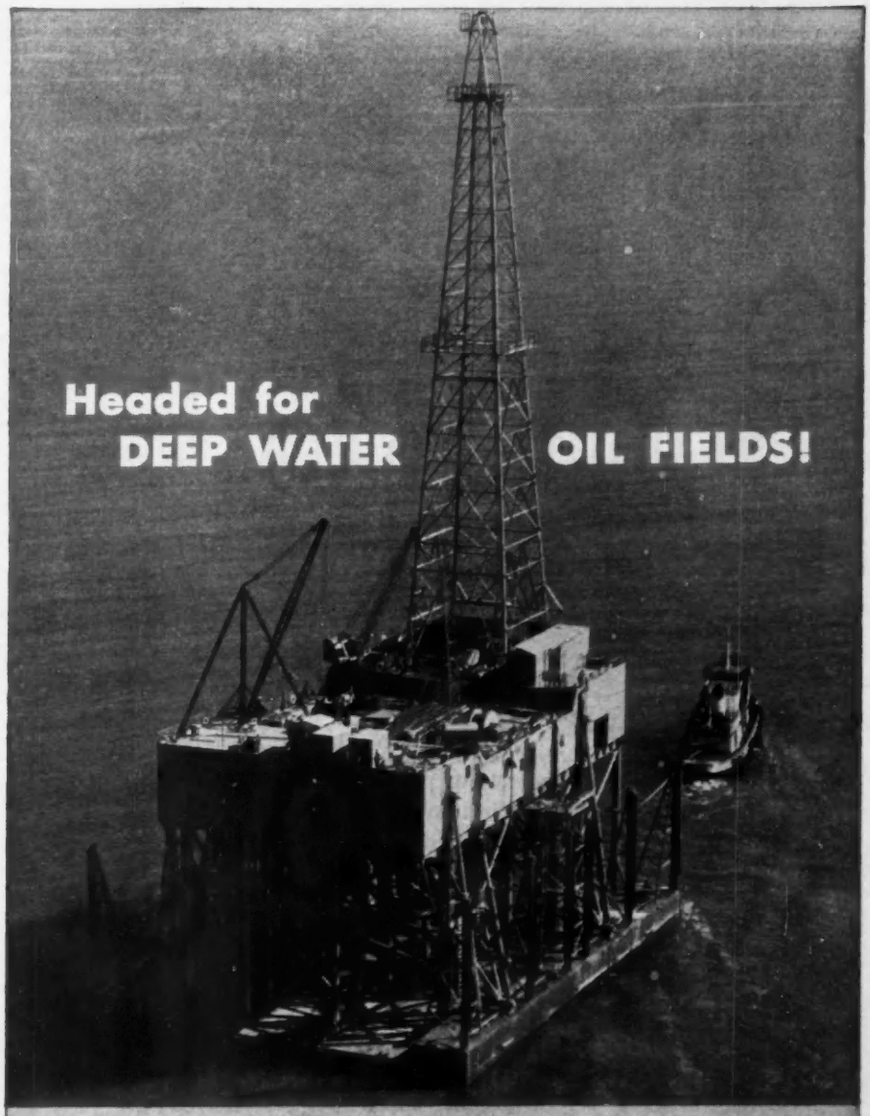
In the new company Jersey Standard is associated with Raffineria Siciliana Olii Minerali, a private firm which operates a 40,000-barrel-a-day refinery, which processes Middle East Crude, at Augusta.

Executives elected to administer the new company are Dr. V. Cazzaniga, president, and Dr. S. Cerulli-Irelli, directors, and H. F. Belding, managing director. The two directors representing Raffineria Siciliana are A. Moratti and S. Zuco.

Sicilian Well Scheduled By Mediterranean Oil

Mediterranean Oil Company plans to drill an additional well on its Comiso permit in Sicily during 1956. MacMillan Petroleum Corporation of Los Angeles owns 35 percent and Gulf Oil Corporation owns 65 percent interest in Mediterranean Oil. Gulf expects to drill two additional wells on its concession adjoining Mediterranean's permit.

The Comiso area is in southeastern Sicily, about 40 miles west of Syracuse.



Kermac 44, deep water drilling rig built by Ingalls for the Kerr-McGee Oil Industries, Inc., heads out into the Gulf of Mexico.

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(For more data on advertised products, use Readers' Service blue cards, last page this issue.)

First Report Made On Turkey Oil Law Changes

In a direct move to insure so far as possible the prompt, uninterrupted and efficient development and use of the nation's oil resources through private initiative and capital, Turkey has made its first announcement of new amendments to its Petroleum Law 6326, enacted March 16, 1954.

The Ministry of State Enterprises said last month that after more than a year's experience with the 1954 oil law, it was evident that clarification of some points and outright changes in others were required to attract the desired speedy development.

Although amendments affected about 40 articles of Petroleum Law 6326, significant changes included:

- Clear definition of the requirement that domestic crude needs be supplied above all else. In addition, the market price of oil in Turkey has been based on the free competitive price determined by the world market; however, to encourage development of domestic oil industry, tariff protection has been established for domestic sales.

- Drilling requirements have been eased. To allow time for more thorough study of possible drilling locations, the drilling requirement on exploration concessions has been extended from three years to five years.

- Economic conditions will be considered in determining whether oil must be produced upon discovery.

Concerning the financial clauses of the law:

- Total rental, royalty, customs, other import duties, and taxes will not exceed one-half of the operators' net profits, and profit sharing will be calculated on this premise. Additionally, previously-recognized exemptions from customs and other import taxes has been extended.

- Principle of free transfer of capital and profits has been recognized. The rate of exchange prevailing at the time of entry of the capital will be accepted as the governing rate when the transfer is made.

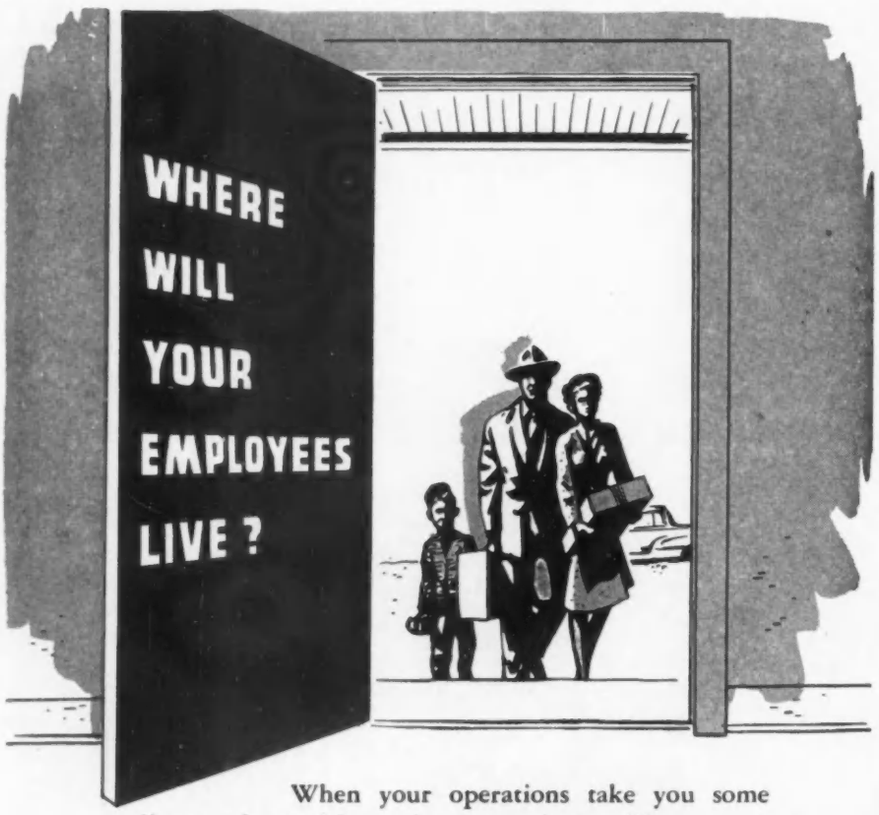
- Personnel training requirements have been eased. Restrictions no longer apply to geologic studies and exploration activities.

Germany's Natural Gas Production on the Rise

Natural gas production in West Germany rose as expected during the first quarter of 1955, largely because delivery to Osnabrueck from Rehden field, located south of Bremen near Diepholz, has begun on a large scale.

This field, discovered in 1952, produced about 700 Mmcf of natural gas during the first quarter, heading the production list of West German gas fields. Increased production from Itterbeck and Frenswegen fields, now connected with the pipe line to Marl, and addition of Stockstadt gas field, which now largely supplies the Ludwigshafen market, are the main factors contributing to the production increase.

Oil production has also increased, reaching a daily rate of more than 57,000 barrels in March. Production from a young field, Dueste-Westingsmoor in the Weser-Ems district, was greater in March than in January and February.



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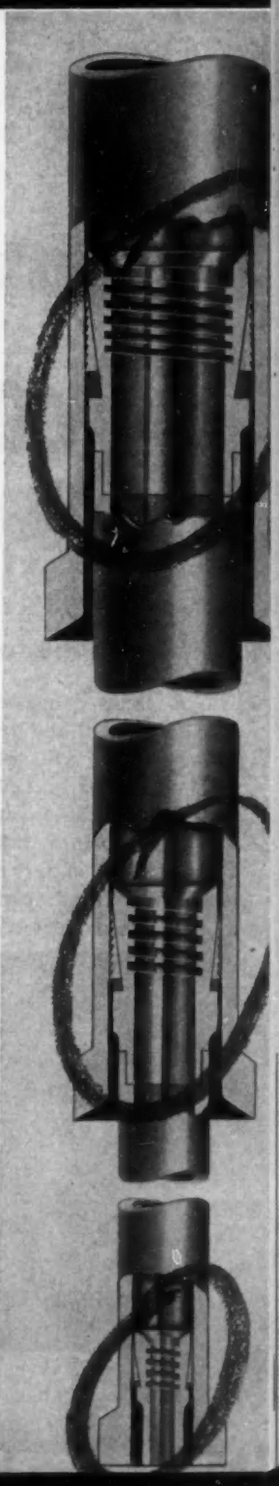

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Westward Ho-Sundre Area Oil Activity Increasing

Intensity of exploratory and development operations in the Westward Ho-Sundre area of southwestern Alberta has increased substantially during the past few weeks. Seven wells were being drilled or were scheduled to be drilled at the latest report. Locations are in the vicinity of the two Mississippian oil discovery wells in that area. The scene of activity is about 60 miles north of Calgary and about 20 miles west of Olds town.

The Westward Ho oil discovery well was drilled earlier this year by Hudson's Bay Oil & Gas Company, Ltd., and the Home Oil Company, Ltd.-Federated Petroleums, Ltd., group of companies. From Mississippian limestone perforations between 8755 feet and 8830 feet, the well flowed light gravity crude at a rate of 1002 barrels daily through a 16/64-inch choke.

The initial potential at Hudson's Bay's wholly-owned Sundre 1 discovery, drilled last year, was 2808 barrels daily through limestone perforations between 9130 feet and 9178 feet through a ¾-inch choke.

Here is what TK-2 plastic linings have done for some oil companies . . .

A Texas company installed 3,000′ of 2″ pipe lined with TK-2 plastic in a 7,500′ well pumping 175 bbl of salt water and 60 bbl of oil per day. Bottom hole pressure was 2800 psi and bottom hole temperature was 233° F. After five years the Tube-Kote lined pipe was still giving excellent service.

Another company put a salt water disposal system into operation with 3″ down hole pipe lined with TK-2 plastic and 3,000′ of 4″ uncoated surface pipe. In eight months the uncoated pipe had to be replaced. Well was pulled after a year and the 3″ pipe lined with TK-2 looked as perfect as the day it was installed.

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Italy Asks for U. S. Aid To Support Oil Monopoly

In a major policy development, the Italian government apparently has asked for U. S. financial assistance to enable its oil and gas monopoly to continue research activities. Italian Premier Scelba reportedly has submitted an official note to Washington concerning Italian crude reserves in which he indicated his government would not object to foreign capital oil exploration investment in Italy.

However, one restriction was repeated: such foreign investment should not exceed 49 percent of the capital of each company. Thus, 51 percent would be reserved by the Italian government.

Meerdorf 2, German Test, Finds Oil at 5564-5572 Feet

Gewerkschaft Elwerath's test well Meerdorf 2 has found oil in the Dogger beta sandstone at 5564-5572 feet. Thus, a further petroleum reservoir has been discovered in the Brunswick-Peine district. Wildcat Meerdorf 1, situated about half a mile northwest of Meerdorf 2 and which was drilled in July, 1954, had proven gas and condensate in the same zone.

First production tests at Meerdorf 2 resulted in an oil flow of 45 barrels of crude daily through a one-sixth-inch choke.

ERRATA

Principal provisions of the project submitted by the nation's president to the Chilean Congress to modify the established oil monopoly and to allow private companies to participate in the nation's oil development—discussed on Page 292, WORLD OIL, April issue, by Dr. J. E. Rassmuss—should have read as follows:

- Exploration concessions shall range up to 100,000 hectares, or 247,100 acres. After two years, one or two areas, not exceeding 25,000 hectares, or 61,775 acres each, shall be selected for drilling . . .
- If oil is discovered, a 30-year-maximum development contract for a maximum of 5000 hectares, or 12,355 acres, in each drilling area may be negotiated.

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Next time you're tempted to get a direct quotation from the manufacturer, whether on a big or small item, figure out *all* the costs—not just the first cost—and you'll find you gain much more, yet in the long run pay no more, by utilizing the services of your distributor.

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What's Happening

AMONG MEN IN THE INDUSTRY

Marion E. Dice

William F. Kirk

Marion E. Dice, appointed assistant to the president of **General Petroleum Corporation,** will be succeeded as manager of the company's Economics department by **W. F. Kirk.** Dice has been manager of the Economics department since 1944. He started with General Petroleum in 1923 as a draftsman and spent his early years with the company in the Engineering department. Kirk, who has been assistant manager of the Economics department since 1949, joined General Petroleum in 1929 as a clerk in the comptroller's department.

•

G. R. (Nick) Carter has been named head of **Buffalo Oil Company's** division office at Midland, Texas. **Clayton Lee,** will serve as district geologist at Ardmore, Okla., and **Charles T. Easley,** as district geologist and landman in the Lafayette, La., office. Buffalo has also established a regional office in Fort Worth, Texas, headed by **William W. Lomerson,** formerly with Gulf Oil Corporation.

•

Max C. Eastman, vice president of **Reserve Oil and Gas Company** in charge of field operations, has been elected a member of the company's board of directors. He fills a vacancy on the board caused by the recent death of Stanley Pedder. Before joining Reserve Oil and Gas Company in 1951, Eastman was in charge of field operations for the Navy at Elk Hills.

•

J. W. Schmid has been elected vice president and director of the **West Coast Refining Company** and the **Arrowhead Oil Company.** He also is vice president of the Youngstown Steel Products Company, vice president and director of National Oil Company and a director of Emsco Manufacturing Company, Basin Oil Company and of the Sandberg-Serrell Company.

•

William McCabe, Casper, Wyo., geologist, has opened consulting offices in the Casper Realty building. He recently resigned as division geologist for Stanolind Oil and Gas Company. In his 13 years with that company, he had been district geologist, exploration superintendent and Rocky Mountain regional geologist. Before joining Stanolind, McCabe was with Superior Oil Company.

John R. Ellis of Casper, Wyo., is no longer associated with Jenkins & Hand, consulting geologists, and is establishing his own consulting service for oil, gas and uranium, with offices at 205 E. 12th Street, Casper. Previous to his employment as geologist for the above firm he was employed by The Carter Oil Company for five years in Montana, Oklahoma and Wyoming.

•

Rycade Oil Corporation recently announced the election of **Flavy E. Davis** as general manager of the company, with offices in the Esperson Building, Houston, Davis resigned as vice president and general manager of J. Ray McDermott Company to join Rycade. Before joining McDermott, Davis was manager of exploration for American Republics Corporation.

•

C. C. Gandaubert, general superintendent of the Production department, has completed 35 years of service with **General Petroleum Corporation.** With the company since 1920, he has held various positions in the Production department, starting as a roustabout in the Ventura oil fields. He was appointed general superintendent in 1950.

•

Hal F. Nabors has been promoted to assistant general manager of **Continental Oil** Company's Central region, with headquarters in Oklahoma City. He formerly was Southern region production manager for Conoco at Houston. Nabors has had wide experience in Conoco's Production department, serving in a variety of positions for 21 years in New Mexico, Wyoming, Colorado and Texas. He was district production superintendent in Texas and Wyoming before his promotion in 1949 to assistant manager of Conoco's Southern region Production department at Houston. He became Southern region production manager at Houston in 1952. **E. A. Austin** has been named to replace Nabors at Houston. Formerly assistant regional production manager, Austin joined Conoco in 1939 as a roustabout at Tepetate, La. He became division petroleum engineer at Tepetate in 1937 and transferred to Houston in 1948 as Southern region petroleum engineer. He was promoted to assistant production manager for Conoco's southern region in 1952. In the Rocky Mountain region, **J. R. Sanders** has been promoted to assistant geologist. Formerly assistant to the manager of the company's geological section at Houston, he will make his headquarters in Denver. Sanders joined Conoco in 1945 as a geologist in Louisiana. Transferred to New Orleans in 1953 as division geologist, he was named assistant to the headquarters geological section manager at Houston in 1954.

Hal F. Nabors

W. G. Moore has retired from **Gulf Oil Corporation.** A veteran of more than 20 years with the company, Moore has served as assistant to president under J. Frank Drake, S. A. Swensrud and W. K. Whiteford, Gulf's current president. During his service to Gulf, Moore's activities were concerned largely with economics and coordination of the company's major operations. More recently he has been actively engaged in the development of the company's petrochemical interests.

W. G. Moore

•

Humble Oil & Refining Company recently announced the following changes in Production department personnel: **Chris M. Myers,** roustabout, Athens district, East Texas division, promoted to roustabout gangpusher at Athens; **R. B. Cowart,** senior petroleum engineer, West Texas division, transferred to the Louisiana division office as senior petroleum engineer; **D. H. Winchell,** petroleum engineer, East Texas division, transferred to the Louisiana division; **M. V. Bates,** petroleum engineer, Southwest Texas division, promoted to senior petroleum engineer in the Louisiana division; and **C. W. Peter,** senior petroleum engineer, Conroe district, Gulf Coast division, transferred to the Louisiana division office. **H. P. Bezner,** associate civil engineer, Southwest Texas division office, has been moved to the Louisiana division office as associate civil engineer; **C. M. Carothers,** district supervising petroleum engineer, Stratton district, Southwest Texas division, transferred to the California area as assistant area petroleum engineer; **L. B. Schnitz,** associate petroleum engineer, Kelsey district, Southwest Texas division, promoted to petroleum engineer at Kelsey; and **R. G. Tonkin,** district petroleum engineer at Greta, transferred to Stratton district, Southwest Texas division, as district supervising petroleum engineer.

•

Paul L. Lyons has joined the **Sinclair Oil & Gas Company** as chief geophysicist. For three years Lyons has been manager of exploration and production for Anchor Petroleum Company, beginning his career in 1934 with Humble Oil & Refining Company.

•

Dr. Max S. Littlefield has been named division chief geologist for **Gulf Oil Corporation** in Tulsa. With Gulf for 28 years, he has worked in the Southwest, the Illinois basin, the Rocky Mountain areas, and has handled special assignments in Canada, Venezuela, Cuba, British Honduras and Denmark. A specialist in stratigraphy, he is a recognized authority on carbonate rocks.

Keating Drilling Company announces the election of **B. W. Beebe** as vice president in charge of production. Formerly a partner in the firm of Manhart, Millison and Beebe, exploration consultants and oil operators, Beebe has opened an office of Keating Drilling in Oklahoma City. Employed by Shell Oil Company in 1935 as geologist, he was assistant to the exploration vice president when he joined British-American Oil Producing Company in 1938 as division geologist. He organized the exploration department for the Bay Petroleum Corporation in 1942, serving as that company's first vice president in charge of exploration, and moved to Oklahoma City in 1947 as exploration manager for Anderson-Prichard Oil Corporation. The consulting firm was organized in 1950.

B. W. Beebe

•

George Stetson has been appointed chief engineer of **Delta Gulf Drilling Company.** Formerly with Offshore Company, Stetson has had extensive prior experience in machinery design and application with the Pacific Car and Foundry Company, Tierney Manufacturing and Engineering Company and the Hunt Tool Company.

•

Edwin B. Cox and **Edwin L. Cox** have moved their office from the Magnolia Building to 1200 Adolphus Tower in Dallas, Texas.

Jed B. Maebius has resigned as assistant exploration manager, Tulsa Production division, Gulf Oil Corporation, to enter private consulting work. His headquarters will be in Tulsa. Joining Gulf in 1935, he was zone geologist of the Michigan area, staff geologist at Tulsa, zone geologist at Casper, and, in 1951, was made manager of exploration for the Casper area. In 1954 he was appointed chief geologist for the Tulsa production division.

•

Stanolind Oil & Gas Company has named **F. H. Allen** division engineer at Oklahoma City. Former district engineer at Corpus Christi, he joined the company as a roustabout in 1940. **W. A. Van Hook**, former production superintendent for the Shreveport district, has been moved to Oklahoma City as assistant division production superintendent, and **P. D. Manning, Jr.**, who has been Central division engineer, goes to Shreveport to suceed Van Hook.

•

John Van Fossen, formerly a geologist at Olney, Ill., for the Pure Oil Company, has been made district geologist for the Tri-State area of **Kewanee Oil Company.** His headquarters will be at Evansville, Ind.

•

Graham B. Moody, oil reserves engineer, has established offices in San Francisco and Berkeley as a petroleum consultant. Moody retired last year from Standard Oil Company of California after 34 years of geological work. At the time of his retirement he was the company's chief petroleum reserves engineer. His San Francisco office is located at 215 Market Street.

Lewis W. Douglas, former ambassador to Great Britain and an internationally-known American businessman, has been elected a director of **Continental Oil Company.** It was announced at the same time that **P. Malozemoff**, New York City, director and president of Newmont Mining Corporation, has been elected a director of Continental, replacing Charles F. Ayer who has retired.

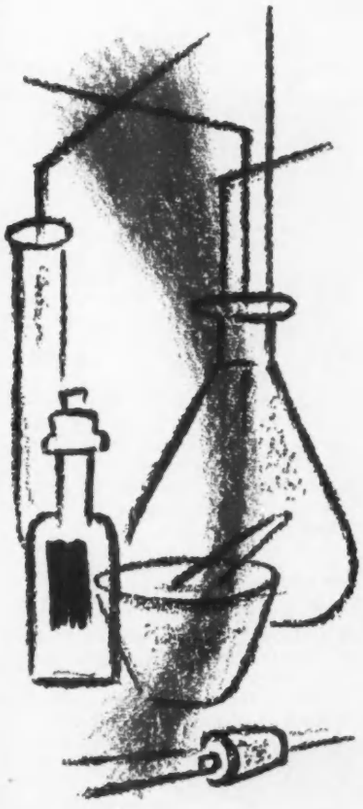
•

S. A. Womack, Jr., has been appointed geologist for **Trans-Tex Drilling Company.** With Union Producing Company of Shreveport since 1940, he was a geologist with the company at the time he joined Trans-Tex Drilling. During the past two years he has concentrated on gas and oil reserve work and property valuation in south and East Texas, north and south Louisiana, Mississippi and offshore Louisiana. He will be in charge of the Geology department at Trans-Tex.

S. A. Womack

•

Robert J. Meers has joined **Cyprus Oil Company,** Division of Cyprus Mines Corporation, at Houston as superintendent of production. Meers has been chief engineer for Loffland Bros. Drilling Company at Tulsa, and, prior to that, was division superintendent of production for Union Oil Company of California at Houston.



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Even though most of our customers never see our lab at Breckenridge, its facilities and technicians are as much a part of our service as our fleet of field units.

Analyses of customers' field brines, cores, and cuttings are made by expert chemists, petroleum engineers, and geologists at our Breckenridge lab. All our stations have modern portable equipment for on-location checking of brine and spent acid. Our Guymon and Odessa labs are equipped to make complete analyses of brines and formation cuttings.

Also important to our customers is the research that our lab does on new materials and new processes for well servicing, the continuous review of our quality control, the re-evaluation and improvement of materials and processes used by our service units in the field, and the constant study of other products and methods as they are introduced to the industry.

So our lab is a significant part of the service work our customers receive. It's one of the reasons our crews do such a good job. Nowhere in the oil patch will you find a better outfit . . . with better men, better equipment, or better facilities. The Chemical Process Company • Breckenridge, Texas • Service Stations Throughout the Mid-Continent Area.

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OKLAHOMA CITY
Rainbo Service Co. - - - ME 4-2131, ME 2-3045

WICHITA FALLS
Hudson-Eads, Inc. - - - 2-3767, 2-8584, 3-4690

this ___ __ _ _____ is "Tuffy Nuff"

SEE PAGE 183. For information write Box 100-W, c/o World Oil, Houston, Texas.

William E. Kammerer has been promoted to the new position of supervisor of operations of **Tide Water Associated Oil Company's** Western Marine department. Formerly vessel dispatcher and office manager of the department, Kammerer joined Tide Water Associated in 1920 as a clerk in the Transportation division. **Harry C. Ruf** will continue as supervisor of engineering for the company's Western Marine department. Ruf has been with Tide Water since 1924.

•

L. K. Lancaster

L. K. (Ken) Lancaster, formerly division geologist for the Central division of Tide Water Associated Oil Company, will be in charge of exploration for the firm of **Edwin B. Cox & Edwin L. Cox.** He has had nearly 20 years of varied geological experience in Gulf Coast and Mid-Continent areas. He will be headquartered in Dallas.

•

Dr. Fred D. Fagg, Jr., president of the University of Southern California, has been elected to the board of directors of **Union Oil Company of California,** succeeding the late Gurney Newlin. Fagg has been president of USC since 1947, coming from Northwestern University where he had been vice president and dean of faculties for nearly ten years. He is a member of the board of directors of Freedoms Foundation and the Edison Company.

•

Henry C. Calhoun has been elected a vice president of **Southern Production Company, Inc.,** in charge of the Land department. Formerly manager of the department, Calhoun joined the company in 1947 after serving with Carter Oil Company. **Hugh W. Curfman,** formerly assistant regional geologist for the Sun Oil Company, has been named district geologist for Southern Production in Lafayette, La.

•

Frank Goldstone has been named manager of the newly-created exploration section of **Shell Oil Company's** Technical Services division in Houston. This Division acts as consultant to Shell's head office concerning exploration and production activities in the U. S. and Canada. Goldstone, a veteran of 33 years with Shell, has been serving as assistant manager of the division. He first came to Houston in 1926, after four years of geophysical work in Borneo. He became chief geophysicist in the Dallas office and returned to Houston in 1932 where he held various geophysical posts before becoming executive assistant to the director of technical Services. He has held his present post as assistant manager since 1953. **Joseph Chalmers** will be manager of the division's production section, and will continue to handle administrative functions affecting both production and exploration sections.

J. E. Owens, area geologist for Shell Oil Company, Tulsa, has been transferred to the company's head office exploration staff in New York. Owens first joined Shell in 1933 as an engineer trainee at Oxford, Kansas. In 1945 he was appointed division geologist at Wichita Falls and two years later transferred to Oklahoma City in the same capacity. Owens was appointed area geologist in the Tulsa office in 1949.

E. E. Marshall, formerly district superintendent at Livingston, Gulf Coast division of **Humble Oil & Refining Company,** has been transferred to the Mallalieu district, Louisiana division, as district superintendent. **James C. Posgate,** division petroleum engineer, Louisiana division, promoted to assistant division superintendent of Louisiana, has been replaced by **Harry Pistole,** formerly division petroleum engineer of the East Texas division. **John G. Calvert,** assistant division petroleum engineer of the East Texas division, was promoted to division petroleum engineer. **W. J. Greenwald,** assistant chief reservoir engineer, Petroleum Enginering division, Houston, transferred to the East Texas division as assistant division petroleum engineer, was replaced by **H. B. Barton,** formerly assistant area petroleum engineer, California area. Taking Barton's place in California is **C. M. Carothers,** district petroleum engineer, Stratton district, Southwest Texas division. **R. B. Riggs, Jr.,** district petroleum engineer, Gladewater district, has been transferred to the Petroleum Engineering division, Houston, as senior petroleum engineer. **R. R. Die,** senior petroleum engineer, Southwest Texas division office, has been moved to the Scott & Hopper district, Southwest Texas division, replacing **J. E. Willingham,** who transferred to the division office as senior petroleum engineer. **George B. Wells,** district chief clerk, Government Wells district, Southwest Texas division, was transferred to the Wasson district, West Texas division as district chief clerk; **W. T. Slick, Jr.,** senior petroleum engineer, Petroleum Engineering division, Houston, was transferred to the Winters district, North Texas division as district petroleum engineer; and **H. A. Stanford,** roustabout gang-pusher, Avoca district, North Texas division, was promoted to farm boss at the Pampa district North Texas.

•

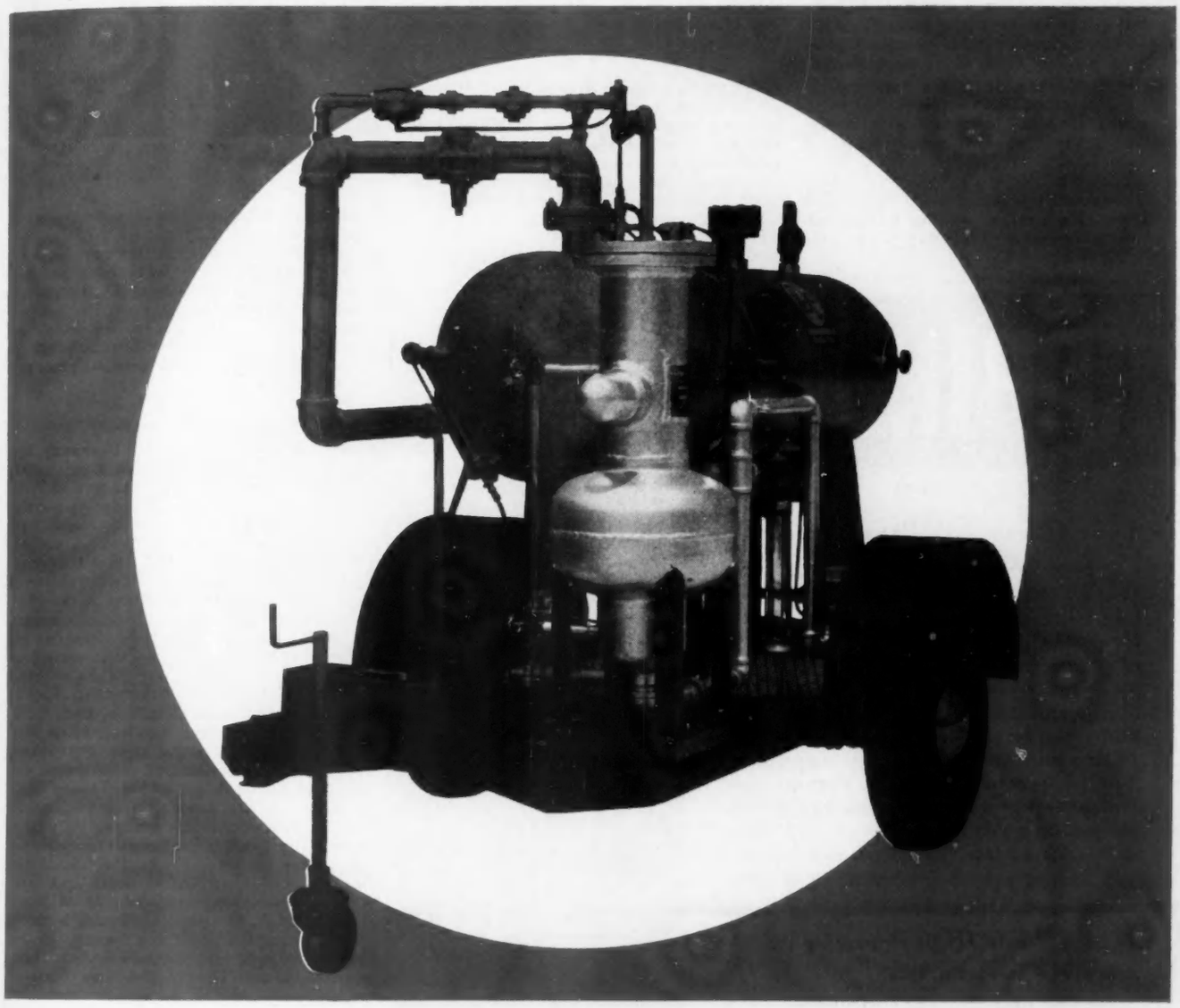
Stewart P. Coleman

Stewart P. Coleman, a member of the board of directors of **Standard Oil Company (New Jersey)** since 1946, has been elected a vice president. Coleman started in the oil business with Humble Oil & Refining Company, a Jersey Standard affiliate, in 1920 as a chemical engineer. He joined Jersey Standard in 1933 as manufacturing representative on the company's Coordination Committee, central study and advisory group for Jersey affiliates. When the company formed its Coordination and Economics department he became its first manager. He became chairman of the Coordination Committee in 1954.

•

William E. Walkup has been elected to membership on the board of directors of **Signal Oil and Gas Company** and has been appointed controller. Starting with Signal in 1939, Walkup has been acting as administrative assistant to the president. Other appointments to newly-created positions in the Accounting department include: **Charles P. Wassung,** named assistant controller, **Gerald F. Krause,** named assistant treasurer to specialize in tax work; **Alton N. Lester,** named chief accountant for royalties and production, and **Waldo W. Powers** named chief accountant for insurance and payrolls.

THE ROLO WELLCHECKER HAS A NEW LOOK



Yes, the new ROLOCHECK Oil Meter* and Automatic Sampler* have given a new look to the familiar Rolo units—a new look that means unbelievable accuracy and maintenance-free operation in crude oil metering and sampling.

TheROLOCHECK meter vessel is *shaped* for accuracy, and its simple internals defy wear and clogging.

And, an automatic free water knockout using the ROLOCHECK water meter is available on Rolo Wellcheckers.

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Write for full information on Rolo Wellcheckers with ROLOCHECK meters. These units separate and meter the oil, water and gas produced by a well or group of wells. Send particulars about your operating conditions, and we will be glad to offer the unit, either skid-mounted or trailer-mounted, for your needs. Or, contact your local Rolo representative.

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5776

O. H. Eichelberger, district superintendent of the South Central Texas district of Pan American Production Company, has been appointed division superintendent of the **Pan American Gas Company.** Continuing as superintendent of the South Central Texas district production activities, his additional duties will consist of supervising all of the gas company's field operations conducted from the Texas City gas terminal.

Charles E. Sonntag, Jr., senior engineer, of the Pan American Gas Company, has been appointed division foreman, with headquarters in the Texas City gas terminal.

•

C. F. Maginnis has joined **Lago Petroleum** Company, Houston, as geologist. He had been with Midstates Oil Corporation for nearly 10 years.

Fred W. Kumpf has been made senior production foreman at Casper, Wyo., for **Mobil Producing Company.** He will be in charge of producing operations for the company in southern Wyoming and the Powder River Basin. **Turner C. Smith** will replace him as engineer for Mobil in the Big Horn Basin, with headquarters at Worland.

•

Elmer F. E. Schmidt, former vice president and general manager of the Lone Star system, has been elected president of **Overland Oil, Inc. Winfield Morten,** Overland president since its organization, has been elected chairman of the board of directors. Schmidt, who directed much of the expansion of the Lone Star system, joined Lone Star Gas in 1918, became chief engineer in 1922 and general superintendent in 1925.

J. W. W. Whitney

N. D. Farrell

Helmerich & Payne, Inc., operators of White Eagle Oil Company's producing properties, has announced the appointment of **J. W. W. Whitney, Jr.** as chief production engineer and **Norman D. Farrell** as chief production clerk. For the last six years, Whitney has been district petroleum engineer for Magnolia Petroleum Company in Electra, Texas. Farrell previously worked for Deep Rock.

•

Sunray Mid-Continent Oil Company has elected **F. W. (Dick) Borden** a vice president of the company and manager of West Coast district operations. Borden joined the company in 1930 serving as roustabout, pumper, gager and field clerk in various California areas. In 1952 he was appointed manager of the California district, on transfer of Sunray's Vice President **R. E. (Ed) Foss** of the Tulsa general offices as manager of production. **I. H. Hughes,** formerly assistant to Albert E. Pierce who retired as vice president in charge of Mid-Continent Petroleum Corporation production May 1, has been named assistant to Foss. Mid-Continent was merged into Sunray on May 16, and Hughes, along with the former Mid-Continent production department, was absorbed into the expanded Sunray Mid-Continent organization. Other changes in Sunray Mid-Continent's supervisory personnel for production department field operations include: **E. F. Patrick** named Sunray Mid-Continent north and West Texas district superintendent at Midland, Texas, and **A. E. (Roy) Hoffman,** formerly district superintendent for Sunray in this district, named superintendent of the Louisiana-Arkansas-Texas (Tri-State) district with headquarters at Lewisville, Ark. Patrick was formerly superintendent for Mid-Continent in West Texas. **E. S. Pierce** of the Mid-Continent organization has been named district engineer for Sunray Mid-Continent's West Texas district at Midland; **F. M. McDaniel,** formerly Tri-State district superintendent, has been transferred to Corpus Christi, Texas, as assistant district superintendent for Sunray Mid-Continent's south Texas district; **Fred S. Goddard,** formerly South Texas assistant district superintendent, has been transferred to the general offices in Tulsa as assistant to Sunray Mid-Continent's superintendent of production; **V. L. (Fred) Smith** is Sunray Mid-Continent's Oklahoma district superintendent, Oklahoma City; and **Roy E. Wingo,** of the Mid-Continent organization, has been named assistant Oklahoma district superintendent.

•

Daniel F. O'Rourke, of the D. F. O'Rourke Drilling Company, and **James N. McGirl,** former district manager of exploration of Tide Water Associated Oil Company, have formed the **O'Rourke-McGirl Drilling Company.** Their offices are in the National Bank of Tulsa building.

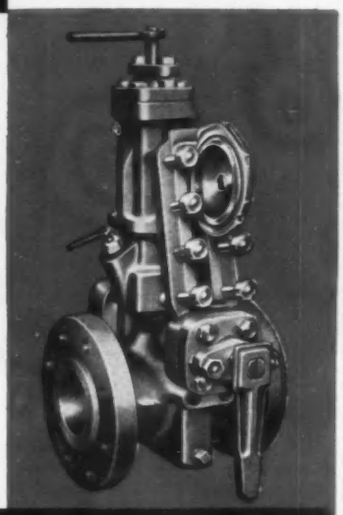
ROBINSON

OLDEST NAME IN ORIFICE FITTINGS

Type E For Low Pressure . . .

2" to 30" A.G.A. Spec.

Where, except at Robinson, can you obtain all these features in an orifice fitting for gas or liquid flow? Extreme accuracy of measurement is yours because the Robinson orifice is always centered with the piping and sealed against leakage. Orifice plates can be changed safely and quickly (3 to 5 minutes) with no interruption in flow, no hazards or gas loss. Various sizes and pressure ranges up to 3,600 PSI, flanged or welding neck.



Type E For High Pressure . . .

2" to 6" Pipe Size A.G.A. Spec.

Same fine metering characteristics as the standard low pressure Type E shown above, but built for 6,000 PSI with positive pressure seal which becomes tighter as the pressure increases. Safety is assured because the fitting cannot be opened until the pressure is released. Available in flanged or welding neck. Compare Robinson point-by-point and you'll choose Robinson.

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Standardize on Robinson orifice plates regardless of the make of fittings on your lines. Robinson plates conform rigidly to A.G.A. requirements. Our 30 year reputation for building accurate orifice plates is protection you can count upon.

GM DIESEL
CASE HISTORY No. ID2B-86

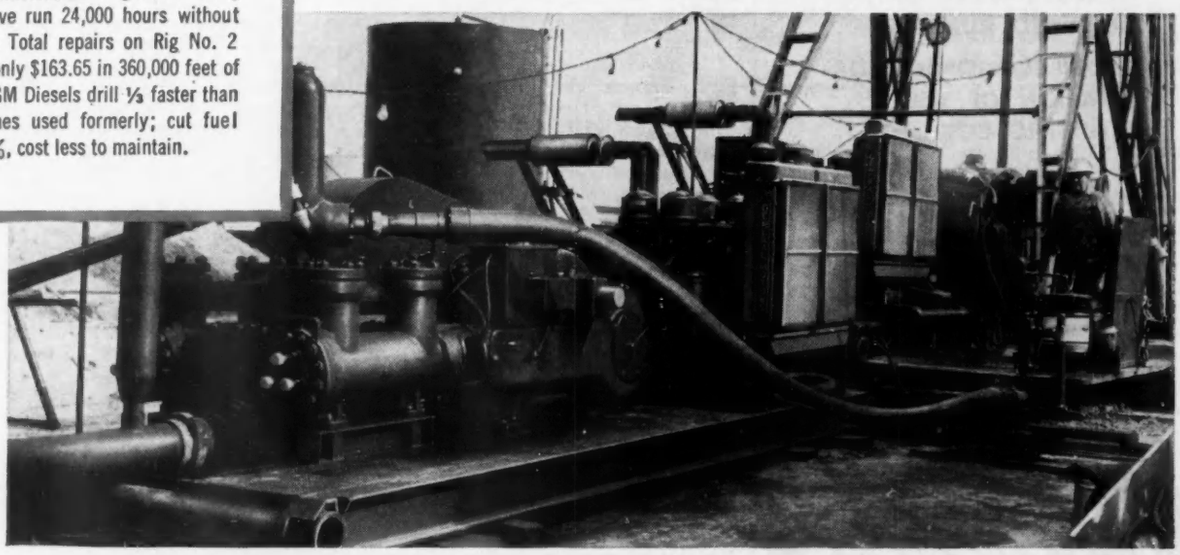
OWNER: Empire Drilling Company, Wichita, Kansas.

INSTALLATION: Two GM Twin "6-71's" drive National Supply draw works and Ideal mud pumps. Empire owns two rigs of this type.

PERFORMANCE: Engines on Rig No. 1 have run 24,000 hours without overhaul. Total repairs on Rig No. 2 came to only $163.65 in 360,000 feet of drilling. GM Diesels drill ⅓ faster than gas engines used formerly; cut fuel costs 33%, cost less to maintain.

Drills ⅓ Faster, Cut Fuel Costs 33%

Since he Switched from Gas to General Motors Diesel Power



Dan Kornfeld of Empire Drilling grew up on the end of a pipe wrench. He says, "You can't beat the performance of GM Diesels. I've got the extra power I need for jet bits and, with less weight per horsepower, I can move faster and easier."

You'll make hole faster with General Motors Diesels on your rig. These compact 2-cycle engines deliver power on every piston downstroke—accelerate faster, respond to throttle controls quicker.

And moves will be faster, easier and cheaper, too, because a GM Diesel packs more power in a smaller, lighter engine that's easy to load on trucks—fits road widths—requires no special road permits.

A GM Diesel is easy to service and maintain. There are no troublesome high-pressure fuel lines—simple unit injectors are almost as easy to change as a spark plug. It burns fewer gallons of regular Diesel fuel that's available no matter where you're drilling.

These engines are backed by a widespread distributor organization that supplies fast service and quick parts delivery day or night. Call your GM Diesel distributor or supply house for more information on GM Diesel power or write direct for full details.

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- CONTINUOUS LUBRICATION OF POLISHED ROD
- LONGER WEAR OF THE PACKING RUBBERS
- MORE ECONOMICAL OPERATION OF THE STUFFING BOX

No. 176 STUFFING BOX, and No. 176-1B LUBRICATING CAP

Whenever this Ratigan Combination is used, operators have the ideal lubricating system that provides continuous lubrication of polished rod, that results in a substantial reduction in overall operating expense.

Each unit has its own separate oiling system . . . the lubricating cap lubricates the polished rod when the flow of oil in the tubing is retarded . . . the self-oiling stuffing box lubricates the polished rod when the well is not heading.

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Export: National Supply Co., Inc., Export Div.
600 Fifth Ave., New York 20, N.Y.

Jon Thomas Moss has been promoted to senior research chemical engineer at the field research laboratories of **Magnolia Petroleum Company.** He joined the Production Research division at Magnolia's Laboratories in 1952.

•

Thomas F. McGarey, former manager of the Philadelphia region of **Cities Service Oil Company,** has been elected vice president in charge of the Asphalt division. He will divide his time between New York and Philadelphia, meanwhile continuing as district chairman of the Oil Industry Information Committee. **John E. Gately, Jr.,** former manager of the New York division, replaces McGarey as manager at Philadelphia.

•

E. E. Francis, vice president of **Gibralter Oil,** has been placed in charge of company drilling and production in the Mid-Continent area. His office will be in Denver.

R. E. Bridges, Gulf Coast division superintendent of **Humble Oil & Refining Company's** Production department, has been promoted to assistant manager of the department. He replaced Bowman Thomas who resigned to go into private business. In other changes, **R. K. Tracy,** assistant superintendent of the Gulf Coast division, will succeed Bridges as division superintendent and **T. J. Fuson,** assistant chief petroleum engineer, will become assistant superintendent of the division. Bridges joined Humble in 1923 in Wichita Falls as a draftsman, becoming division civil engineer in Amarillo in 1926. From 1946 to 1949 he served as assistant superintendent of the Gulf Coast division and in 1949 was named superindendent.

R. E. Bridges

Deaths

Charles Donovan Martin, 59, died May 29 in Tulsa. A retired oil operator, he went to Tulsa in 1926 and operated independently and as a contractor in Oklahoma, Texas and Colorado.

Jack E. Bliss, 44, co-owner of Rotary Engineers, died in Midland. He was formerly with Amerada Petroleum Corporation and the Baroid division of the National Lead Company.

Allen S. Hicks, Hydril Company production engineer, died May 24. He joined the company as a shop hand in 1930; in 1942 he was named supervisor of engineering development. He was an active member of the Nomad's Club.

Edward J. Bonacker, 92, pioneer oil operator, died May 17 in Tulsa. He was one of the first producers in Glenn pool and was former owner of the Bonacker Oil and Gas Company. He retired in 1928.

Frank G. Helscel, 72, died in Tulsa. A pioneer oil man, he took part in oil operations over Tulsa County and began development of the old Cline Ranch lease on South Peoria Avenue in Tulsa.

Lot (Jerry) Bowen, 57, died in Los Angeles. With the Western Gulf Oil Company for 30 years, he was formerly geologist, petroleum engineer, field superintendent and superintendent of production, Los Angeles division, Gulf Oil Corporation. He was named manager of employe relations in 1949.

Roy D. Roberts, 62, retired Sun Oil Company official, died May 15. Born in West Virginia, he went to Oklahoma in 1913, and later went to Texas as production superintendent at Beeville. He retired in 1953.

Otto Herman Dittmer, 59, division sales manager for Lee C. Moore Corporation, Tulsa, Okla., died May 7. He had been with the company 33 years.

Frank F. Lockwood, 83, died at Ames, Iowa, May 2. He was active in many phases of the oil industry until his retirement in 1950.

Edward F. Walsh, Bartlesville, Okla., retired oil operator, died June 2. He formerly was president of the Walsh Oil Company and operated in Pennsylvania, Indiana, Illinois and Oklahoma.

T. H. (Tom) Sterling, 54, vice president of the Oklahoma Natural Gas Company, died May 19. He had been with the firm since 1926 and was named vice president of the Oklahoma City district last year.

Bert G. Goble, 83, geologist and oil operator, died May 15 in Tulsa. Born in Clarion County, Penn., he went to Bartlesville, Okla., in 1906 and is credited with opening the El Dorado, Kansas, and Stonebluff, Okla., oil fields.

Fred Warfield, 59, died April 26 in Muskogee, Okla. He was formerly an oil well drilling contractor in Locust Grove.

Dr. Irving Perrine, 71, Oklahoma City geologist and petroleum pioneer, died April 25. He was a faculty member at the University of Oklahoma from 1912 to 1915 when he resigned to become a consulting geologist. At one time he headed six oil corporations.

J. R. Schulte, 71, died in Hebart, Okla. An independent oil operator, he had been engaged in gathering and developing oil leases in the Tulsa area and other sections of Oklahoma for many years.

Frank Ross, 72, a retired independent oil man, died in Tulsa recently. A longtime resident of Wichita Falls, Texas, he went to Tulsa in 1943.

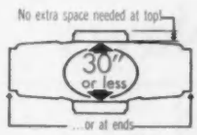
Harvey S. Mudd, 66, former president and director of the American Institute of Mining and Metallurgical Engineer, died in Beverly Hills, Calif. A mining engineer, he was also a former councilor of the Mining and Metallurgical Society of America.

Select Cellar Control Gates by VALUE and you'll buy SHAFFER!

When you buy cellar control gates, compare the important *extra* values you get in Shaffer equipment — space-saving compactness, time-saving convenience, maintenance-saving simplicity and ruggedness — and you'll see why so many operators agree that Shaffer is far and away the industry's top value in blowout protection.

Extra Value #1

SPACE-SAVING COMPACTNESS!



Equipment that is bulky and cumbersome exacts a high toll in greater rig costs, deeper cellar requirements, clumsy hook-ups. Shaffer Hydraulic Gates require a minimum of space — in height, width and length . . . as little as 18½" total height for the 13⅜" (12" Series 900) Single Gates, only 30" for the same size in Double Gates (with two compartments unitized into one body).

And no extra space is needed at the top or ends to allow space for changing rams!

Extra Value #2

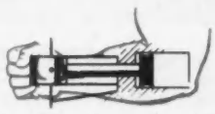
EASY RAM CHANGES

As wells are drilled rams must be changed frequently to meet requirements of varying pipe sizes. In Shaffer Hydraulic Gates you simply open two doors in the side of the body, slide out the ram assembly, change rams, replace the assembly and bolt the doors shut. Closing the doors automatically aligns the rams within the body. And complete ram changes can be made with equal ease whether the pipe is in or out of the hole!

What's more, there's no need to dismantle the upper compartment to change rams in the lower one — or vice versa. Rams in either compartment are changed with equal ease!

Extra Value #3

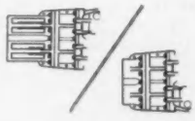
POSITIVE DIRECT DRIVE



In Shaffer Hydraulic Gates there are no yokes or complicated secondary hook-ups between rams and operating cylinders. For positive action, fewest parts, simplest maintenance, the hydraulic cylinders are directly behind the rams — on the same shaft. And note how all operating parts are completely enclosed within the gate body, protected from corrosion or damage.

Extra Value #4

RISING or NON-RISING SHAFTS



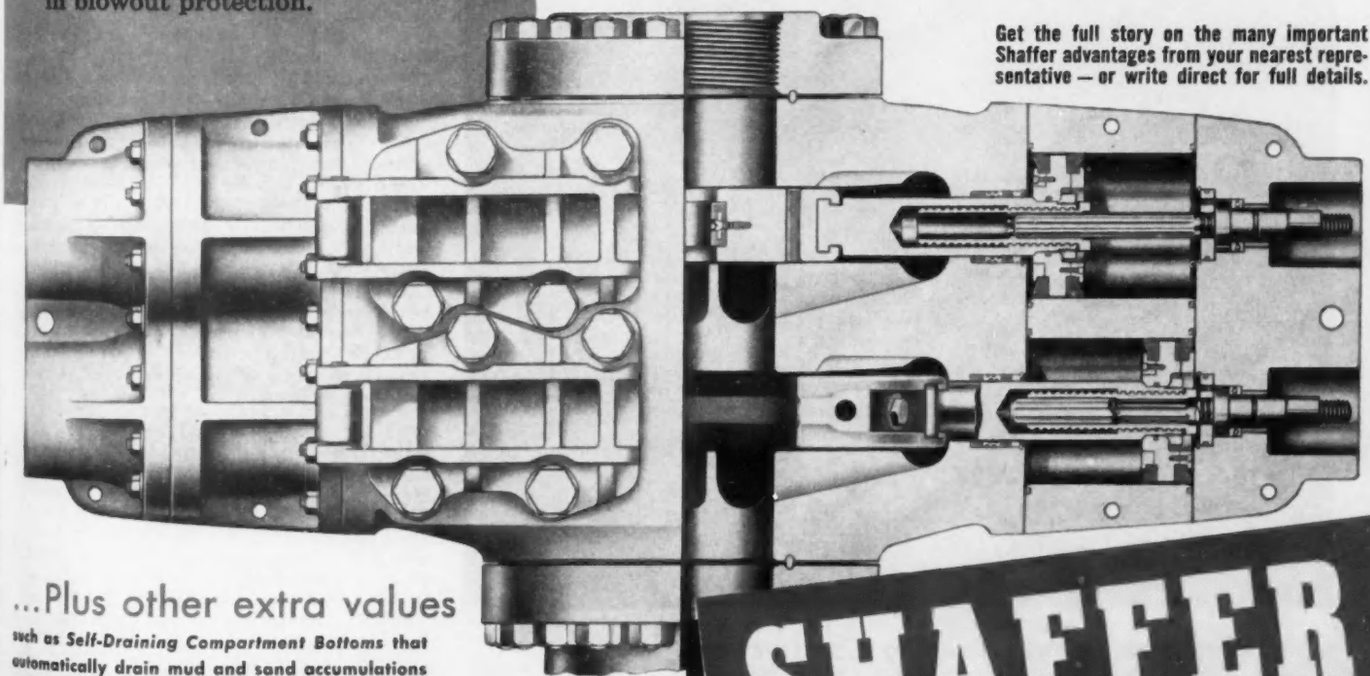
Some operators prefer a non-rising locking shaft for the greater compactness it makes possible. Others prefer a rising shaft for its quick indication of ram position. Take your choice — Shaffer, and only Shaffer — provides whichever design you prefer. And whether the shaft is rising or non-rising, built-in body extensions protect the shafts against damage in all positions!

Extra Value #5

MAXIMUM VERSATILITY

Shaffer provides a choice of either Double or Single Hydraulic Gates, whichever best meets your requirements. Rams and most other parts are interchangeable, size for size, between Single and Double Gates, assuring maximum adaptability to your particular needs — at minimum inventory and maintenance costs.

Get the full story on the many important Shaffer advantages from your nearest representative — or write direct for full details.



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such as *Self-Draining Compartment Bottoms* that automatically drain mud and sand accumulations back into the well . . . *Completely Enclosed Design*, with no moving parts exposed where they can become wedged or damaged by timbers falling into the cellar — or corroded by salt muds or chemicals . . . and *Field-Proven Dependability* backed by over three decades of pressure control leadership and advancement.

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EXPORT SALES OFFICE: Shaffer Tool Works, 500 Fifth Avenue, New York, N. Y., U.S.A.

Companies in the News

THE TEXAS COMPANY is constructing three buildings to be completed by spring, 1956, as the first phase of an extensive expansion of research and testing facilities. The current construction program calls for two new buildings at Texaco's largest research center at Beacon, N. Y., and one new building at the company's largest refinery at Port Arthur, Texas, as follows: A four-story, 29,300 square foot analytical and testing building at Beacon; a three-story-and-basement, 34,100 square foot addition to the present administration building at Beacon, which will more than double that structure's office space; and an analytical and testing building, comprising a joined two-story and one-story structure with a total of 45,100 square feet, at the company's Port Arthur, Texas, refinery.

•

SUN OIL COMPANY'S 23-ship tanker fleet won top honors in the National Safety Council's 1954 marine section safety contest. Sun placed first in the inland waterways category with an accident frequency record of zero, and second in the ocean and coastwise division with a rate of 0.89. This compared with an industry-wide average frequency rate of 3.40 for ocean and coastwise ships, and 2.96 for those sailing on inland waterways. The accident frequency rate is the number of lost-time accidents per million hours.

•

STANDARD OIL COMPANY OF CALIFORNIA'S tanker fleet is the recipient of the first Certificate of Sanitation ever awarded by the United States Public Health Service. A. E. Kihn, manager of Standard's Marine department, accepted the scroll in brief ceremonies on board the tanker S. S. J. H. Tuttle at the company's Long Wharf at Richmond, Calif. The award signified that every Standard vessel received at least a 95 percent rating on an official inspection covering 167 separate times involving both basic construction and sanitation maintenance. Fifteen ships were involved.

•

MICHEL T. HALBOUTY, independent oil operator, consulting geologist and petroleum engineer, has announced plans to erect a $300,000 office building in Houston to house expanding business operations. The one-story structure of stone, brick and glass construction will contain some 12,500 square feet. The building will include modern geological and engineering facilities in addition to offices for executives and staff, including legal, accounting, land and drafting departments.

•

CRON AND GRACEY CORPORATION has been purchased by **John W. Mecom**, Houston independent oil operator. The company will continue in the contract drilling business, fulfilling all current contracts and obligations. No employe changes will be made. Earle C. Hellums will remain in charge of drilling operations and W. H. Martin will remain as office manager. Cron and Gracey was organized as a corporation in 1939, but the two men, Lon H. Cron and E. J. Gracey, had long been active partners as a drilling firm. Gracey will remain on the board of directors along with Mecom, Mrs. John W. Mecom and Max Prather. New officers of the company are Mecom, president; Prather, drilling superintendent for the Mecom Interests, vice president; and R. Hersel Hughes, controller for the Mecom Interests, secretary-treasurer.

Ohio Completes Donnell Building Construction

The Ohio Oil Company recently completed additions to the Donnell Building in Findlay, Ohio, headquarters for Ohio's exploration, production, transportation, refining and marketing operations. New construction included an eight-story east wing, additon of two floors to the original six-story south wing, and the extension of that wing to complete a square structure covering one quarter of a city block.

TOKLAN OIL CORPORATION President Curtis F. Bryan and associates have sold the major portion of their stock in the company to **Clint W. Murchison** of Dallas, **Cecil V. Hagen** of Houston, **Roy B. Kelly** of Washington, D. C., and **G. L. Ohrstrom and Company** of New York City. Other than Bryan's retirement as president and a possible reorganization of the companys directorate, no change of corporate personnel or location of offices is expected.

•

SHELL OIL COMPANY'S New Orleans Exploration department has achieved a safety record of more than one million man hours worked without a lost-time accident in the last 21 months. About 300 persons in division offices and field parties in Louisiana, Mississippi, Arkansas, Alabama and Florida set the record. The group's last disabling injury was on July 16, 1953.

•

CALIFORNIA RESEARCH CORPORATION, subsidiary of Standard Oil Company of California, has let the contract for construction of a new wing on the main laboratory-administration building. The wing, involving an expenditure of more than half a million dollars, is the second part of a $1.5 million expansion program begun last year. A new engine laboratory is presently nearing completion.

•

STANOLIND OIL AND GAS COMPANY, founder of the Stanolind Foundation, Inc., has awarded a total of 16 Stanolind Foundation fellowships to fifteen colleges and universities for the 1955-56 academic year. The fellowships are offered in eight fields of graduate study—five in petroleum engineering; four in geology; two in geophysics and one each in accounting, mechanical engineering, chemical engineering, geochemistry and chemistry. Each fellowship carries a stipend of $1500 and pays tuition and fees. An additional $500 grant is allowed geology fellows for summer field work. Schools to which grants will be made are California Institute of Technology, University of California, University of Colorado, Columbia University, Kansas State College, Louisiana State University, Oklahoma A. and M. College, University of Oklahoma, Pennsylvania State University, University of Pennsylvania (Wharton), Rice Institute, Texas A. and M. College, University of Texas (two grants), University of Tulsa and Yale University.

•

RICHFIELD OIL CORPORATION has established seven one-year fellowships for graduate study at five California universities and colleges for the academic year 1955-56. The fellowships, known as Richfield Oil Corporation Fellowships, have been established at Stanford University in petroleum engineering and business administration, the University of California at Berkley in chemical engineering and petroleum engineering, the University of California at Los Angeles in geology, the California Institute of Technology in chemistry and at Claremont Colleges in geology. Grants of $1500 have been made for each fellowship.

What's Happening

AMONG INDUSTRY ASSOCIATIONS

Whaley Named President Of Drilling Contractors

C. F. Whaley of Chet Whaley Well Servicing Company, Houston, was elected president of the American Association of Oilwell Drilling Contractors to fill the unexpired term of J. V. Dunbar, who died suddenly June 5.

The action was taken by a regular interim meeting of the board of directors in Denver.

Whaley was national vice president of the association.

Corrosion Short Course To be Held in St. Louis

A five-day short course on corrosion sponsored jointly by Washington University, St. Louis, and Greater St. Louis Section, National Association of Corrosion Engineers, will be held September 12-16. The course will include sessions on corrosion theory, metallurgical and mechanical factors, types of corrosion, designing to prevent corrosion, treatment of environments, selection of materials, cathodic protection and protective coatings.

Desk and Derrick Clubs Hold Regional Meeting

Past Association officers who have served in an outstanding manner were honored at the recent annual regional meeting of the Pacific Coast clubs of the Association of Desk and Derrick Clubs of North America. The group included Meitzie Palmer, immediate past first president of the Association; Blanche Kelley, first Association first vice president; Kay Barnes, first regional director of the Pacific Coast clubs; and Lydia Babka, immediate past regional director.

Presidents of the Desk and Derrick Clubs of Bakersfield, Long Beach, Los Angeles, Portland, Sacramento, San Francisco, Seattle, Taft and Ventura represented their respective groups as official delegates at the regional meeting.

Colorado University to Host First Mineral Law Institute

The first annual Rocky Mountain Mineral Law Institute, supplementing the program of the Southwestern Legal Foundation institutes on oil, gas and taxation held each winter in Dallas, will be conducted at the University of Colorado in Boulder, July 21-23. Being organized by the Rocky Mountain Oil and Gas Association, the Colorado Bar Association and the University of Colorado School of Law, the institute will emphasize public land and hard mineral law problems unique to the northern area of the Mid-Continent, Rocky Mountain and Pacific regions.

General topics to be covered will be land acquisition, problems in exploration and development, mineral locations on public lands, taxation of oil, gas and uranium interests, and operational planning. Authorities in all types of mineral law will present research papers.

Petroleum Accountants Society Names Officers

Raymond Horn, right, auditor of Quintana Petroleum Corporation, has been elected president of the Petroleum Accountants Society of Houston. He succeeds Virgil L. Smith, chief accountant for Superior Oil Company. Other officers elected for the year are, left to right, R. A. Isaacks, Meredith & Company, secretary-treasurer; W. S. Warren, Jr., Humble Oil & Refining Company, second vice president; W. B. Smith, General Crude Oil Company, first vice president.

API Eastern District Awards Service Citations

Presented recently with citations for service by the Eastern district of the API Division of Production were, left to right, R. B. Anderson, Columbian Carbon Company; John T. Galey, independent producer; A. W. Thompson, API vice president for production who made the presentations; Robert L. Tope, Tope Oil Company; and Sam S. Taylor, U. S. Bureau of Mines. The citations to Anderson, Galey and Taylor were for "outstanding service" to the Eastern district in various capacities over a period of years. Tope received a meritorious service award for service to the Michigan chapter.

Electrical Conference Of Oil Industry Planned

Technical papers and discussions dealing with electrical subjects in the refining, production and pipe line fields of the petroleum industry will be presented at the second Electrical Conference of the Petroleum Industry scheduled for Houston September 12-14.

Sponsored by the Petroleum Industry Committee and the Houston Section of the American Institute of Electrical Engineers, the conference sessions will be open to all persons. Field trips to nearby installations will be offered.

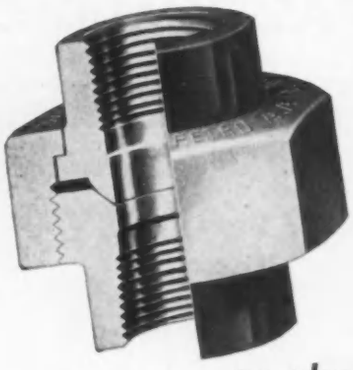
H. M. Stewart, Humble Oil & Refining Company, Baytown Refinery, has been named conference chairman; H. J. Kongabel, Westinghouse Electric Corporation, vice chairman.

Warren Baker Receives Houston API Citation

Warren L. Baker, vice president of The Gulf Publishing Company and editorial director of WORLD OIL and PIPE LINE INDUSTRY, has been awarded the first Meritorious Service Award given by the Houston Chapter of the American Petroleum Institute. Chapters were authorized to present such awards last year.

Baker was secretary-treasurer of the chapter in 1939; vice chairman in 1934 and 1938; and chairman in 1940.

UNDER THE TOUGHEST CONDITIONS . . .



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Denver Club Honors Oil Man

The Denver Petroleum Club has named E. P. Tallent, left, its "Man of the Year." Tallent is secretary-treasurer of the club. Now retired, he was formerly Rocky Mountain region manager for Union Oil Company of California. Holding the award plaque with Tallent is G. F. McMillan, Gulf Oil Corporation.

Cashell Named Chairman Of API Eastern District

Jack Cashell, of the Preston Oil Company, has been elected chairman of the Eastern district, Division of Production of the American Petroleum Institute for the coming year.

Eight vice chairmen, elected to serve with Cashell, are: James M. Bird, Bird Well Surveys; Ralph N. Burns, Chartiers Oil Company; W. B. Maxwell, United Fuel Gas Company; Richard J. Murdy, New York State Natural Gas Company; Fred C. Newman, Old National Bank; S. B. Plummer, Hughes Tool Company; Douglas Rogers, Jr., South Penn Oil Company; N. E. Trumbull, Ohio Fuel Gas Company.

Lysle R. Kirk, Ohio Oil Company, was elected district secretary-treasurer.

A. O. Graybeal to Head Pacific Coast District

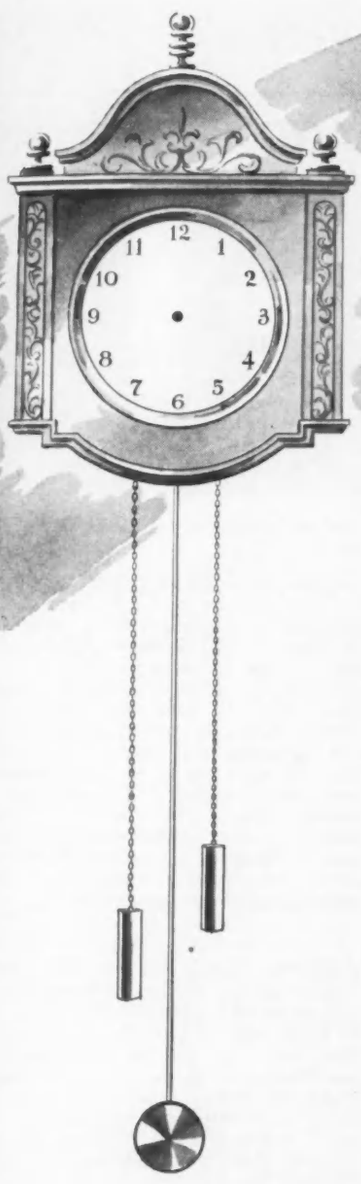
O. A. Graybeal of Sunray Oil Corporation was elected chairman for 1955-56 of the Pacific Coast district, Division of Production, American Petroleum Institute at the annual spring meeting.

Other officers elected were H. H. Carrick, Jr., of General Petroleum Corporation, vice chairman, Los Angeles Basin; Don Sweet of Richfield Oil Corporation, vice chairman, Coastal area; J. J. Oliphant of General Petroleum Corporation, vice chairman, San Joaquin Valley; Irv Dagan of Standard Oil Company of California, Coalinga-Kettleman; Charles T. Reichert of National Supply Company, treasurer; Elsie M. Edmiston of the API, secretary; Sam Grinsfelder of Union Oil Company, chairman of the Advisory Committee; and John Bell of Humble Oil & Refining Company, vice chairman, Advisory Committee.

Von Hagen Elected Head Of Oil Producers Agency

R. R. Von Hagen, president of Lloyd Corporation, was elected president of Oil Producers Agency at the recent annual meeting of the association.

Von Hagen, who succeeds R. A. Grant as president of the independent oil producers group, has been a director of the organization for several years and was a vice president prior to his election as president. F. W. Borden, Sunray Oil Corporation, was elected vice president.



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What's Happening

AMONG SERVICE AND SUPPLY MEN

M. E. Montrose, vice president of Hughes Tool Company, Houston, was elected president of the **Petroleum Equipment Suppliers Association**, at its annual meeting, held in Banff, Alberta, Canada, June 12-14. **Rainey Elliott**, Jones & Laughlin Steel Company, Tulsa, was elected vice president. The 1955 meeting was the largest in the history of the association. The three days were taken up in committee meetings and general sessions.

M. E. Montrose

One of the highlights of the meeting was an address by **H. H. Somerville**, Deputy Minister of Mines and Minerals of the Province of Alberta. He spoke on the friendly attitude of the Alberta government toward the oil industry and the allied petroleum equipment industry, the progress now underway in the development of the Canadian industry, and its future possibilities.

At a general meeting **Ferd Spang** of Spang and Company, Butler, Pennsylvania, was made a director emeritus.

Following are the committees as recommended to and appointed by President Montrose:

Executive committee: Eastern district; **M. B. Jones**, S. M. Jones Company. Mid-Continent district; **F. E. Bernsen**, Lucey Products Corporation. Southwestern district; **E. A. Johnson**, Schlumberger Well Surveying Corporation. Pacific district; **Wendell Jones**, Bethlehem Supply Company of California.

Special finance committee: Chairman, **F. E. Bernsen**, Lucey Products Corporation. **E. S. Dulin**, Byron-Jackson Company; **Mason B. Jones**, The S. M. Jones Company; **F. M. Mayer**, Continental Supply Company.

Suppliers Committee: Chairman, **R. W. Gordon**, National Supply Company; vice-chairman, **Harold H. Wilson**, Jones & Laughlin Steel Corporation, Supply Division. Eastern division: **D. W. Mackie, Jr.**, Bradford Supply Company; **Jene Harper**, Franklin Supply Company; **S. A. Hawkins**, McJunkin Corporation. Mid-Continent and Rocky Mountain district: **C. R. Zimmerman**, Bethlehem Supply Company; **W. G. Rudd**, Lucey Products Corporation; **R. G. Ayers**, Bovaird Supply Company; **S. O. Barren**, Mountain Iron & Supply Company. Southwestern district: **F. M. Mayer**, Continental Supply Company; **L. E. Tracey**, Oilwell Supply Division, U. S. Steel Corporation; **W. D. Wilson**, Wilson Supply Company; **Don Thornbury**, Midcontinent Supply Company. Pacific district: **J. J. Pike**, Republic Supply Company of California; **Wendell Jones**, Bethlehem Supply Company; **H. E. Howard**, Howard Supply Company.

Manufacturers Committee: Eastern district: **Paul Scherf**, Alten Foundry & Machine Works, Inc.; **Paul Summers**, Parkersburg-Aetna Corporation; **John Seiler**, Tube Turns, Inc. Mid-Continent district: **Paul Courtney**, George E. Failing Company; **M. G. McCool**, American Iron & Machine Works; **K. W. Davis, Jr.**, Unit Rig & Equipment Company. Southwestern district: **L. A. Little**, Lufkin Foundry and Machine Company; **Joe Rebman**, McEvoy Company; **Ott Hammer**, Security Engineering Division, Dresser Operations, Inc. Pacific district: **W. A. Wilson**, Web Wilson Oil Tools; **W. W. Greenway**, Axelson Manufacturing Company; **W. Powell**, Emsco Manufacturing Company.

Service Companies Committee: Chairman, **John J. Standt**, Dowell Incorporation. Pacific division: **H. H. Peters**, Technical Oil Tool Corporation; **M. T. Higgs**, Lane-Wells Company; **I. J. McCullough**, McCullough Tool Company; **John B. Merritt**, B-J Service, Inc. Gulf Coast (Southwestern division): **R. W. Henderson**, Baker Oil Tools, Inc.; **Elliott A. Johnson**, Schlumberger Well Surveying Corporation; **J. E. Smith**, Johnston Testers, Inc.; **George B. Coole**, Baroid Division, National Lead Company; **George E. Justice**, Houston Oilfield Material Company, Inc. Mid-Continent division: **H. C. Otis**, Otis Pressure Control, Inc.; **W. G. James**, Eastman Oilwell Surveying Company; **Grover Kilgore**, Halliburton Oilwell Cementing Company; **A. C. Polk, Jr.**, Dowell Incorporation. **Tax-Insurance-Legislative Subcommittee: J. M. Sandlin**, Halliburton Oilwell Cementing Company. **Explosives Transportation Subcommittee: H. C. Wells**, Schlumberger Well Surveying Corporation. **Explosives Safety Subcommittee: A. L. Burns**, Houston Oilfield Materials Company.

Statistical Research Committee: Chairman, **R. W. Rager**, Oilwell Supply Division, U. S. Steel Corporation. Other members to be appointed.

Public Relations Committee: Chairman, **George O'Leary**, Houston Oilfield Materials Company.

Lien Law Committee: Chairman, **John C. Griffin**, National Supply Company.

Wolverine Tube, division of Calumet & Hecla, Inc., announces the appointment of **Dr. Donald Q. Kern** as professional consultant in the field of heat transfer. Kern has served for many years as design engineer for several of the country's leading manufacturers of heat transfer equipment, including the Foster Wheeler Corporation and the Patterson Foundry & Machine Company. In his association with Wolverine Tube, he will work with Wolverine's sales and field engineering representatives concentrating on copper, copper base alloy and electric welded steel condenser tube applications and design and process applications of Wolverine Trufin, the integral finned tube.

W. W. Schweitzer

Clyde W. Vassar

United States Steel Supply, steel warehousing division of U. S. Steel Corporation, has established a sales representative at Fort Worth, **William W. Schweitzer**, who moves to his new assignment from Pittsburgh. He serves primarily the immediate Fort Worth area and northwest Texas, including the Wichita Falls area, the Panhandle and South Plains. Schweitzer will serve as a resident salesman for steel products distributed by U. S. Steel Supply division. He has been associated with U. S. Steel Supply division five years and at the time of his Fort Worth assignment was a sales correspondent in the division's Pittsburgh warehouse.

Clyde W. Vassar has been appointed assistant general superintendent of the new expanded steel pipe mill near Provo, Utah, of **U. S. Steel's** Consolidated Western Steel division. Other staff members at the mill are **Walter E. Harris**, chief plant engineer; **Verne W. Thorpe**, chief accountant, Utah; **Don M. Northwood**, supervisor of industrial relations; **R. L. Carlson, Jr.**, supervisor of plant protection and safety; **P. J. Pardini**, material control foreman; **O. S. Starks**, maintenance superintendent; and **John R. Basich**, general foreman, large diameter mill. Vassar joined Western Pipe Company, one of the predecessor companies of Consolidated Western, and has moved through various positions in that division. He was transferred to the new Utah operation from Consolidated Western's Berkeley, Calif., plant where he was in charge of the pipe shop.

George G. Lindholm, manager of the Chicago branch of **Crane Company** since 1948, has been appointed manager of the company's Valve and Fittings department at its general office, Chicago. He succeeds **F. J. Wilkey** who has been named special representative of the industrial sales division. Wilkey has headed the valve and fitting department since 1944. **Thomas D. Kelley** has been appointed manager of the Chicago branch to succeed Lindholm. He has been manager since 1953 of the company's Cleveland branch. Lindholm has been associated with Crane Company since 1919. He was assigned to the general office, the Chicago Works, the former Evanston and Northwest side branches, Louisville, railroad sales and the Detroit branch before being named assistant manager of the Chicago branch in 1944.

L. R. Gaiennie

Roger W. Robinson

H. M. Thomas

James L. Emerson

Albert E. Plomp

Donald E. Dixon

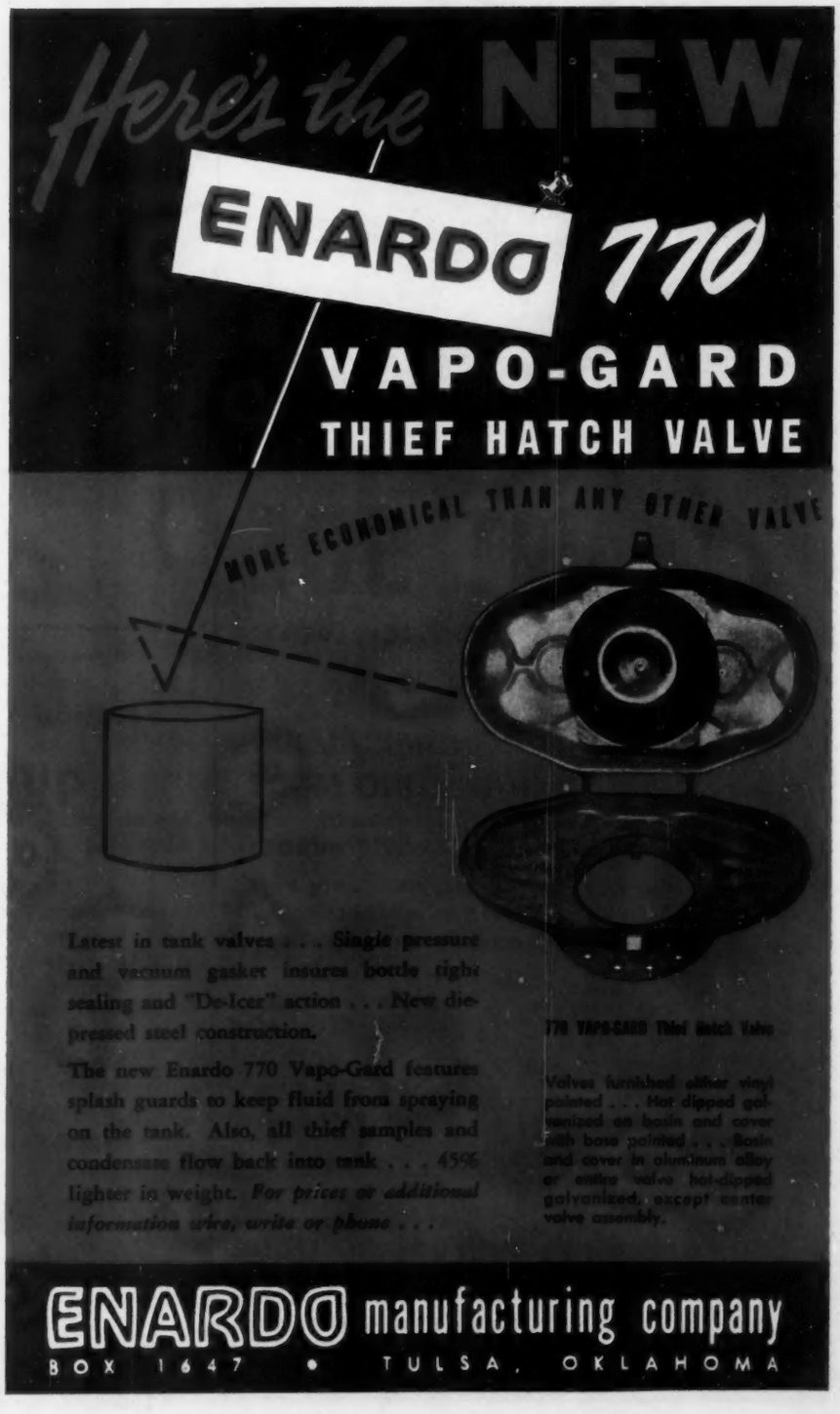
Fairbanks, Morse & Co., has announced that **L. R. Gaiennie,** director of personnel, has been elected vice president-personnel. Prior to joining the company in 1948, Gaiennie was assistant vice president for the Richardson Company. Also announced was the appointment of **John C. Elmburg,** former manager of the company's Portland, Ore., branch, named assistant general sales manager. During his 26 years with the company, Elmburg served as technical assistant, field engineer, department manager and manager of the firm's Boston, Atlanta and Portland branches. He succeeds **Harry L. Hilleary** who is to retire June 30. Emburg is succeeded as Portland branch manager by **William F. Wahlenmaier** who joined the company in 1939 as a technical assistant in the Pump and Electrical department of that sales office. Since 1954 he has been Electrical department manager.

Roger W. Robinson has been appointed sales manager for **Clark Equipment Company's** Transmission division. With headquarters at the company's transmission plant in Jackson, Mich., Robinson will be responsible for sales of Clark transmissions, torque converters and power train packaged units. With the company since 1941, he was previously company representative handling transmission and axle sales to earthmoving and agricultural equipment manufacturers.

H. M. Thomas, a veteran in the field of steel erection and fabrication, has been appointed general superintendent of the new pipe mill of **U. S. Steel's** Consolidated Western Steel division. He has been assistant superintendent of construction since start of work on the project adjacent to Geneva Works last fall. Production of large-diameter, high-strength expanded line pipe is scheduled to start soon at the new mill. During his service with the U. S. Steel unit. Thomas has supervised the construction of many steel buildings, tanks and equipment of dams in Texas, Oklahoma, Louisiana and Arkansas.

James L. Emerson was recently appointed to the newly-created post of assistant to the manager of **Chiksan Company's** Sales Development department. He will devote the major part of his time to Chiksan's advertising and sales promotion program. He was formerly advertising manager of The George S. Thompson Corporation. **Albert E. (Dutch) Plomp** has joined **Chiksan of Canada, Ltd.** as senior salesman, handling sales of Chiksan ball-bearing swivel joints, rotary hose, loading arms, unions and other Chiksan and Weco equipment. Headquarters will be in Calgary. Plomp was formerly associated with Lion Oil Company and Kellogg Company of Canada.

Donald E. Dixon has been assigned to **Cooper-Bessemer Corporation's** Tulsa office as field engineer. He will devote his activities to both application and sale of engines and compressors for service on pipe line transmission for petroleum and chemical processing in the Oklahoma area. Prior to this appointment, Dixon was manager of the compressor section, Sales department, at the Mount Vernon, Ohio, plant.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B. Bronzan

Leo Cypher

C. H. King

D. H. Ross

V. C. Horner

Dr. Ernest H. Koepf has joined the administrative staff of **Core Laboratories, Inc.,** as manager of the company's Research and Development department. He will plan and direct an expanded research program including development of concepts of factors affecting reservoir performance, advancement of new analytical procedures, and improvement of existing methods now used in determining the presence of hydrocarbon bearing formations and their individual productive characteristics. Prior to his association with Core Lab, Koepf served as administrative coordinator in the crude production department of The Atlantic Refining Company. From 1952 to 1954 he was associated with Texas City Chemicals, Inc., as vice president and general manager.

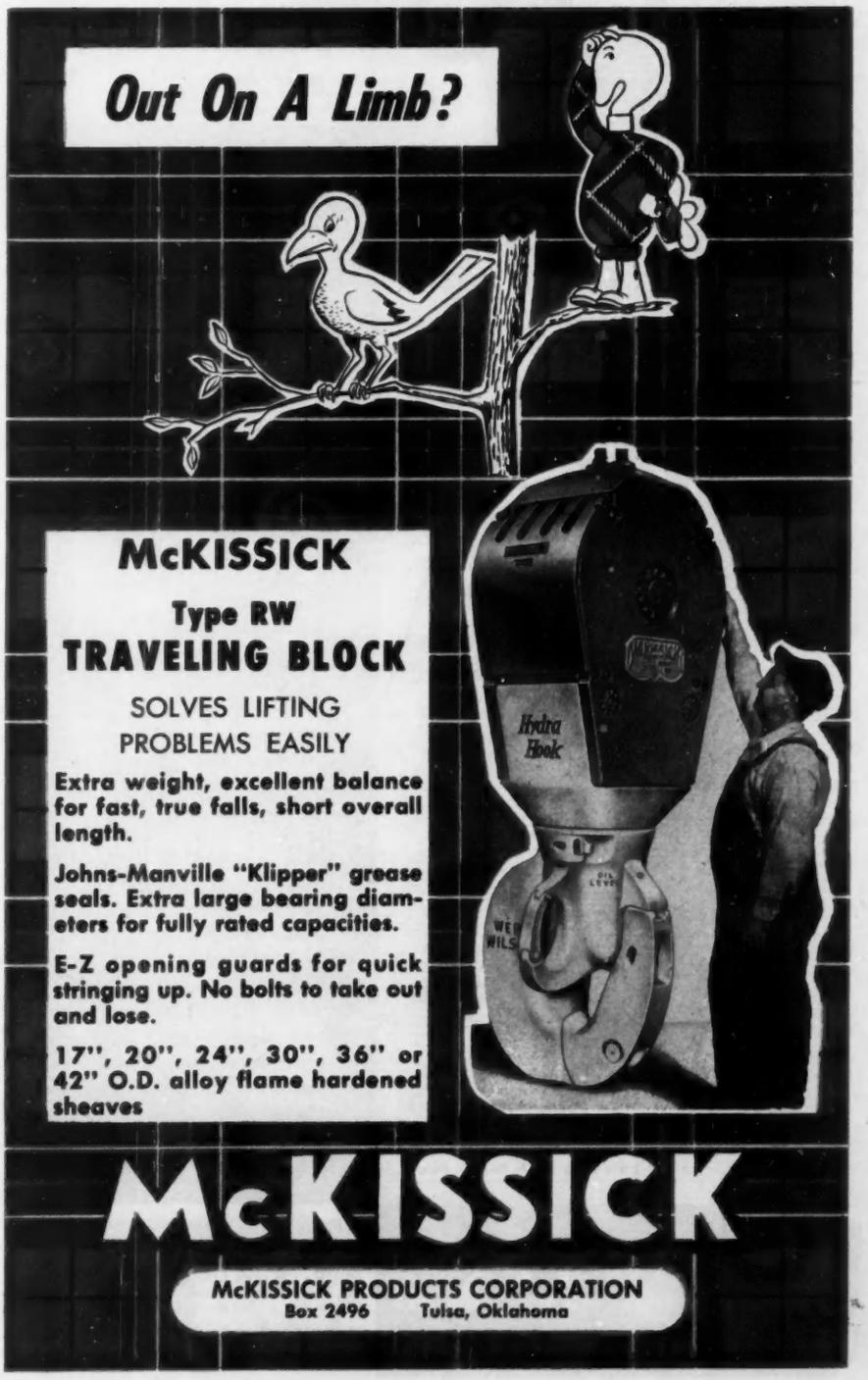
Baash-Ross Tool Company, division of the Joy Manufacturing Company, has announced the appointment of **B. Bronzan** as assistant general manager for worldwide Baash-Ross operations. Known throughout the oil industry for his knowledge of field methods, he was general manager of the Adel Precision Parts Company before joining Baash-Ross. The promotion of **Leo Cypher** to West Coast area sales manager has also been announced. A Baash-Ross service man and sales representative since 1937, he has charge of all sales in the West Coast area. His headquarters are in Los Angeles.

Clark Equipment Company shareholders have elected **C. H. King** and **D. H. Ross** to fill newly-created positions on the firm's board of directors. King, a member of the Clark organization since 1925, is vice president of the company. He is in charge of operations of Clark's Automotive division. Ross formerly was treasurer of Ross Carrier Company and its subsidiary, Michigan Power Shovel Company, prior to their acquisition by Clark in 1953. He is now assistant to the president at Clark.

V. C. Horner has been appointed assistant manager of the **Byron Jackson Company** Oil Tool division. He was in charge of oil tool engineering in the Mid-Continent region and for the past four years has been general manager of the BJ Hydralift division which manufactures hydraulic oilwell pumps. The Byron Jackson Oil Tool division is headquartered in Los Angeles.

Schlumberger Well Surveying Corporation has announced the appointment of **G. D. Rosel** as field sales engineer for the Kansas division. Rosel will have his headquarters at Wichita. He was formerly a field engineer for Schlumberger at Independence, Kansas.

Thomas Mellon Evans, president, **H. K. Porter Company, Inc.,** will receive the 11th annual Parlin Memorial Award for outstanding contribution to the field of marketing. The award is in recognition of his contributions to marketing techniques in acquisition of manufacturing concerns during the past six years and in his utilization of market research in relation to the growth of the Porter organization.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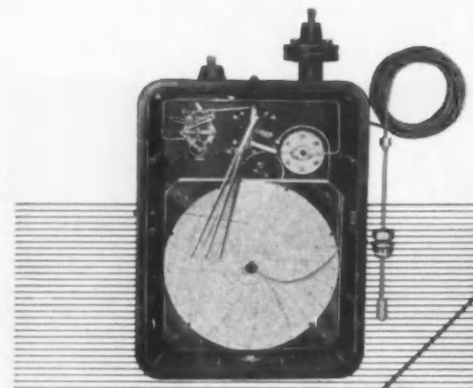
Meter Maintenance is SIMPLER... LESS COSTLY with American-Wescott Orifice Meters

Wherever precision measurement and economy of operation are required . . . at high or low flow rates . . . at varying temperatures . . . whether in recording, indicating, integrating or telemetering models, American-Westcott Series A-88 Orifice Meters are synonymous with accurate, dependable, trouble-free service and low maintenance costs.

American-Westcott Series A-88 standard mercury type orifice meters for working pressures to 5000 psi in interchangeable 10, 20, 50, 100 and 200-inch ranges give you complete versatility to meet any flow measurement requirements.

Recording • Indicating
Integrating • Telemetering

Write for full details.



Flow Recorder with 0-150°F. Standard Temperature Element.

CLEANING manometer body interior is easily accomplished through removal of high and low-side covers. Does not affect meter accuracy.

CALIBRATION is tamper-proof through simple, positive adjustment of float lever arm length.

EXTENDED HIGH SIDE chamber gives additional over-range protection — interchangeable without altering manifold piping.

MERCURY CHECK VALVES give positive shut-off for over-range protection.

TEFLON-PACKED STUFFING BOX is pressure tight, nearly frictionless, never requires lubrication, free from maintenance troubles.

TEFLON-PACKED PULSATION DAMPENER is externally adjustable under full line pressure.

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AMERICAN® METER COMPANY
INCORPORATED ESTABLISHED 1836

GENERAL SALES OFFICE: 1513 Race Street, Philadelphia • Albany • Alhambra • Atlanta Baltimore • Birmingham • Boston • Chicago Dallas • Denver • Erie • Houston • Kansas City Los Angeles • Minneapolis • New York • Omaha Pittsburgh • San Francisco • Seattle • Tulsa

IN CANADA: Canadian Meter Company, Limited, Hamilton • Edmonton • Calgary

Philip L. McLaughlin

Paul C. Kreuch

Eugene F. Foubert

Edward D. Jackson

Cardwell Manufacturing Company, Inc., has announced appointment of **Philip L. McLaughlin,** former drilling editor of WORLD OIL magazine, to head the new Product and Drilling Research department. McLaughlin will be in charge of product and drilling research, in addition to advertising and sales promotion. His past engineering experience has been with Continental Oil Company at Hobbs, N. Mex.; The Ohio Oil Company in the Yates field, Iraan, Texas; in the Midland district office, Midland, Texas; and in the Houston division office, Houston, prior to joining WORLD OIL in 1952. At Cardwell, he will coordinate product and drilling research with the direct sales organization and the New York Export division.

Paul C. Kreuch, assistant to the vice president in charge of **Rockwell Manufacturing Company's** Meter and Valve division, was named a vice president in that division, and **Eugene F. Foubert,** manager of industrial relations, was named vice president—industrial relations. Kreuch joined Rockwell in 1930 as sales engineer. Prior to this, he had spent seven years in the gas industry, including three years as chief engineer of Missouri Public Service Company. Foubert joined Rockwell in 1941 as personnel manager of the Oakland, Calif., plant. In 1945, he was named manager of industrial relations for that plant. He was transferred to Pittsburgh in 1947.

Edward D. Jackson has been appointed general sales manager of the **Axelson Manufacturing Company,** Division of U. S. Industries, Inc. He will direct national and international sales operations for Axelson manufactured products from headquarters at Axelson's main office in Los Angeles. Prior to joining Axelson, Jackson was associated with the Toledo Scale Company as vice president in charge of sales; he also was a director of the company.

Graver Water Conditioning Company has announced the appointment of **J. D. Crell** as sales engineer for the New York City Sales district. With Graver for several years, he will work out of the New York office.

Hellmuth Walter

Robert S. Sherwood

Donald M. Wilson

J. M. Hoerner

R. L. Green

Harold Horton

Hellmuth Walter has been named director of research at **Worthington Corporation,** succeeding **Ralph M. Watson** who recently resigned to become associate dean of the L. C. Smith College of Engineering, and chairman of the department of mechanical engineering, Syracuse University. After World War II Walter worked with the British Admiralty for over four years, and in 1950, came to the U. S. as consulting engineer at Worthington's Wellsville Works. In 1951 he was transferred to the Harrison, N. J., headquarters. **Robert S. Sherwood,** who joined Worthington in 1951 as consulting engineer, has been appointed assistant director of research. Formerly a professor of mechanical engineering at Iowa State College, he also spent several years with the National Supply Company in field research and testing.

Donald M. Wilson has been appointed sales representative for **Well Equipment Manufacturing Corporation** in the Rocky Mountain area. His headquarters will be in Casper, Wyo. Formerly sales representative for the Fred Dewell Specialty Company, Wilson also will be sales representative for Chiksan swivel joints, steel rotary hose, mud guns and other products in his territory.

J. M. Hoerner has been appointed general manager of the Chemical division of **Armour and Company.** He succeeds **F. B. Patton** who has been appointed general manager of the Armour Auxiliaries. Hoerner will be responsible for all activities of the division, including production and marketing of fatty acids, fatty acid derivatives and industrial oils. He joined Armour as director of sales and purchases of the Chemical division in 1953. Previously, he was with Atlantic Refining Company.

Otis Pressure Control, Inc., has announced the appointment of **R. L. (Bob) Green** as superintendent of the Houston division. Formerly service specialist in the Houston branch, he joined Otis in 1944, and has worked as sales engineer in Hobbs, as division superintendent at Odessa and as a wire line specialist in Elk City. **Harold Horton** has been named service specialist in Houston. With the company nine years, he formerly was wire line specialist.

I. John Billera has been elected vice president and treasurer of **U. S. Industries, Inc.** He has been treasurer of the company since February, 1953. His headquarters will be in the main offices in New York. Prior to joining U. S. Industries, Billera was controller and assistant treasurer of Noma Electric Corporation, secretary-treasurer of Edward Ermold Company, and before that, audit manager of the Sperry Gyroscope Company.

W. A. (Bud) Oweiss, recently appointed West Texas-New Mexico sales engineer for Rockwell Manufacturing's **Edward Valves, Inc.,** completed the Edward training program last year. Recently he has been helping introduce the new Edward MUDWONDER mudline valve in the West Texas oil fields.

BOWEN
RELEASING SPEARS
Have a Perfect Releasing Mechanism
Bowen Releasing Spears not only insure the ability to pull the fish but also permit *release* at will. In the releasing position, there is no possible means of forcing the slips outward. The slips are in a neutral slot which insures that they cannot be expanded to contact the fish.
For your inside-the-pipe jobs and for holding liners and casing while landing, this efficient spear—with only six simple parts—gives a positive internal grip on the pipe. Easily withstands hours of steady jarring, yet release has never been known to fail because of its *perfect releasing* mechanism.
If It's a Tough Spear Job, Call Bowen!
Write for a free copy of Bowen's Operation and Instruction Manual which tells of the greater service and satisfaction to be obtained from BOWEN RELEASING SPEARS.
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SANTA FE SPRINGS, CALIFORNIA
EXPORT OFFICE
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NEW YORK CITY, NEW YORK
EXPORT REPRESENTATIVE: VAL R. WITTICH JR.

JUST OFF THE ASSEMBLY LINE...

New Flow Valve

WESTINGHOUSE TYPE D PILOTAIR VALVE

Gives you reliable control of single-acting and double-acting cylinders.

Gives you efficient interlocking and sequencing.

Gives you a choice of hand, foot, pneumatic, mechanical or electrical operation.

YOU'LL LIKE THESE FEATURES

3,125 USES. Every valve is made up from a number of sections that bolt together easily to give you any type of operation.

PRESSURE SEAL *STAYS* IN THE GROOVE. Completely new Westinghouse seal can't roll out of position . . . will not nick, scar or chip.

LONG LIFE, LOW MAINTENANCE. No moving metal parts rub against metal. *Valve spool floats on rubber.* Stainless steel spool and aluminum alloy body resist corrosion.

WRITE FOR MORE FACTS

or get in touch with your local Westinghouse Air Brake Co. Distributor. He's listed in the classified phone book under "Cylinders: Air."

Westinghouse Air Brake
COMPANY
Industrial Products Division

WILMERDING PENNSYLVANIA

Pneumatic cylinders, valves, engineered pneumatic systems and air control devices of all kinds.

Factory Branch: Emeryville, Calif. Distributors throughout the United States. Distributed in Canada by: Canadian Westinghouse Co., Ltd., Hamilton, Ontario.

FOR SWABBING

AUTO-RELEASE WIRE LINE STRIPPER

Finest in the field. King Strippers represent outstanding advances in design and construction that assure long life and maximum operating efficiency:

- POSITIVE LATCH will not release by accident or surge of pressure.
- SURE RELEASE MECHANISM operated by rope socket striking bottom of the stripper.
- NON-SPARKING MATERIALS minimize fire hazard.
- ROLLER WIRE LINE GUIDES on hardened steel pins.
- SIDE OPENINGS for inserting packing while line is in the hole.
- PACKING IS SELF-CENTERING; compression screws need not be evenly adjusted.

Export: R. S. STOKVIS & SONS
17 Battery Place, New York 4, N. Y.

KING OIL TOOLS
7944 DOCKAL ROAD • HOUSTON, TEXAS • ORchard 3-3421

this ___ __
_ _____ is

"Tuffy Nuff"

SEE PAGE 183. For information write Box 100-W, c/o World Oil, Houston, Texas.

G. M. Kernahan

Thomas A. McCoy

G. M. Kernahan has been apointed sales manager of the Canadian division of **McCullough Tool Company.** He will continue to operate out of McCullough's Calgary office, directing and supervising sales operations in western Canada. For the past year Kernahan has been district sales engineer at Calgary and prior to this was district sales engineer at the McCullough Canadian division headquarters at Edmonton. Prior to joining McCullough, Kernahan was logging engineer and sales engineer with Schlumberger Well Surveying Corporation.

Thomas A. McCoy appointed manager of the **Texas-U. S. Chemical Company** will be responsible for the company's synthetic rubber operations in Port Neches, Texas. This will include synthetic rubber research and sales as well as production. McCoy began his career in synthetic rubber in 1944 as project engineer in the synthetic rubber plant in Institute, W. Va. In 1947 he was transferred to the Borger, Texas synthetic plant operated by U. S. Rubber. He became factory manager of the Port Neches synthetic rubber plant when it was reactivated by U. S. Rubber in 1950.

J. S. (Jack) Stewart has been appointed assistant domestic sales manager of **Mission Manufacturing Company.** He has been with Mission 14 years, during which time he has worked in field engineering and sales division.

Joy Manufacturing Company has announced the appointment of **Donald L. Archibald** as district sales manager in the New England area, with headquarters in Boston. Archibald joined Joy in 1940. In 1945 he was named sales engineer in the El Paso territory, later becoming manager of the company's Mexico City office. He was transferred to St. Louis in 1951.

Black, Sivalls & Bryson, Inc. announces the appointment of six men in the Oilfield sales organization. Field supervision is being divided between two oil field sales managers: **Lee Kelton,** named manager of Mid-Continent Oilfield Sales and **Ralph Stevens,** named manager of Gulf Coast Oilfield Sales. Both men will headquarter at Oklahoma City. **Benjamin (Bill) Bourne** has been appointed Oilfield district sales manager for the Houston district, which has been divided into two separate districts, one with headquarters at Houston and the other with headquarters at Alice, Texas. **John Cross** has been named sales manager for the newly-created Alice district. **Jimmy Lee** is new district sales manager for a newly-created Salem Oilfield district, and **John H. Raidl** has been named sales manager, West Coast district, with headquarters at Los Angeles.

"Pressure Rated"
Plastic
Pipe
Job Engineered
To Save You
Money
Now, there's no need to buy expensive heavy-duty pipe for jobs with low pressure specifications. Southwestern's "Pressure-Rated" Plastic Pipe is Job Engineered to meet your specific needs. You select the Pressure Rating to do your job . . . you pay less because you don't buy wasted wall thickness.
You can count on "Pressure-Rated" Pipe . . . Guaranteed and manufactured to the rigid specifications that have made Southwestern the Quality Leader in the Plastic Pipe Field. And as for Safety . . . Southwestern "Pressure-Rated" Pipe is engineered with 5 to 1 Safety Factor.
Southwestern "Pressure-Rated" Pipe is available in 50, 75, 100, 125 or 150 pound pressure ratings. Call, write or wire today for complete information.
5 TO 1
SAFETY FACTOR
WALL THICKNESS
Regardless of pressure rating every pipe is manufactured to a strict 5 to 1 Safety Ratio
SOUTHWESTERN
PLASTIC PIPE CO.
A Division of Texas Vitrified Pipe Co.
MINERAL WELLS, TEXAS
PH. 2050

(For more data on advertised products, use Readers' Service blue cards, last page this issue.)

WORLD OIL'S Trading Post
CLASSIFIED ADVERTISING

RATES: Regular Classified (undisplayed) set in this size type: 12 cents per word. Minimum charge, $3. Blind box address in our care counts six words. Replies forwarded without charge. **Situation wanted ads,** 6 cents per word. **Display ads,** set in suitably larger type with ruled border, $12 per column inch; situation wanted display ads, $6 per column inch. Ten percent discount for two or more insertions of same copy in consecutive issues. **All classified ads payable in advance. COPY DEADLINE:** 17th of month preceding date of issue. Send copy and checks to: **Trading Post Section, World Oil, P. O. Box 2608, Houston, Texas.**

HELP WANTED

■ MECHANICAL ENGINEERS. A medium sized leading manufacturer of oil field equipment and gray iron castings now needs additional engineers for product development and design work. Experience in similar or related work would be favored. All replies confidential. Write stating full qualifications and salary requirements to Box 64-W, c/o The World Oil, P. O. Box 2608, Houston, Texas.

DESIGN ENGINEERS

Well established, progressive Company expanding its Houston Texas manufacturing facilities requires additional design engineers. Experience in design and development of oil well drilling tools and equipment would be favored. This is not just another job. If you have ability and can think opportunity exists. Send complete information and salary requirements. Confidential.
Box 63-W, c/o World Oil, Houston, Texas.

NOTICE

■ ANTI-TRUST CASE SETTLED. After extended negotiation, upon consent of the parties and without trial of the case, upon April 7, 1955, a final judgment was entered in the case of United States of America vs. Magcobar, Inc., Dresser Industries, Inc., Clarence J. Coberly, Dresser Equipment Company and Kobe, Inc., Civil No. 13460-BH. Under the terms of this judgment, Kobe, Inc., is required to grant licenses under its patents relating to hydraulic oil well pumps on a reasonable royalty basis. A list of such patents and a copy of such final judgment will be furnished upon request to **Kobe, Inc.,** 3040 East Slauson Avenue, Huntington Park, California.

BUSINESS OPPORTUNITIES

Well organized, well established oilwell drilling contractor desires the management and supervision of oil properties in West Texas, Central Texas, and New Mexico. Can provide complete handling of oil properties, from acquisition to production. No properties too small, and none too large to handle. Inquiries from independents, groups, small or medium sized oil companies invited. Write, wire, or call collect for further information.

MAKIN DRILLING COMPANY
P. O. Box 1628 — Hobbs, New Mexico — Phone 3-3141
146 Allen Building — Midland, Texas — Phone 2-2962

POSITIONS WANTED

SAFETY DIRECTOR—16 years' experience in industrial accident prevention, petroleum industry, including exploration, drilling, production, refining, natural gas transmission and petrochemical manufacturing. Fully qualified in fire protection engineering and industrial training. Excellent references and achievement record. Presently on foreign assignment. Desire to relocate in U. S. Member American Society Safety Engineers. Age 35. Available August 1. Box 62-W, c/o World Oil, Houston, Texas.

OIL INDUSTRY PHOTOGRAPHER

Experienced photographer with complete professional equipment, capable of recording company property, operations and personnel in pictures for sales, public relations, record and historical purposes, including company magazine illustrations and feature stories, wants full-time connection with large independent. Might consider assignments on a temporary basis outside the U. S.
Presently employed; would change only for an exceptional opportunity in return for excellent and conscientious work.
Box 65-W, c/o World Oil, Houston, Texas.

MISCELLANEOUS

■ AVOID DRILLING DRY HOLES—CARRILLO'S scientific method for oil exploration is a direct technique that accurately locates oil deposits. Twenty years of experience and success. Carrillo's survey puts the drill on the oil. For service, write to CARRILLO, 1013 No. Main Street, Santa Ana, California.

CUBAN OIL

Our organization can obtain oil concessions, farmouts, join in the financing of oil developments, handle all Government, corporate, legal, fiscal, banking, accounting, labor, and all local matters relating to the oil industry.

Solicit our report on oil possibilities in Cuba

VALORES PETROLEROS, S.A.
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VEDADO, HAVANA, CUBA
Cable address: PETROLEROS, HAVANA

■ JAMESON STRAW FIELD, COKE COUNTY, TEXAS. Complete Oil Production History. Seven million barrels, monthly reports. Helen Marshall, Oil Reports, 2217 Dallas Street, San Angelo, Texas.

■ OIL AND URANIUM LOCATING SERVICE. Worthwhile properties. Approximate depth of oil and minerals determined. Drilling locations pinpointed. Documentary proof of success. Young and Critchlow, 1975 N. W. Everett, Portland, Oregon.

The Continental Supply Comany has announced the election of **Alton A. Dunaway** as assistant secretary and assistant treasurer and the appointment of **Richard C. Johanson** as director of personnel and training. Dunaway joined Continental as a floorman and warehouseman in Rodessa, La., in 1936. He was appointed assistant credit manager in 1951. Johanson came to Continental from the Dallas assembly plant of the Ford Motor Company where he was supervisor, employe services and training.

The Pacific Coast Borax Co., division of Borax Consolidated, Limited, announces the appointment of **W. J. Dibble** as general sales manager, Western division, Bulk department. In his new position Dibble will supervise operation of the Agricultural Sales division and be responsible for industrial sales in the western states. Dibble was formerly associated with the Oronite Chemical Company.

Borg-Warner Corporation has announced the election of four new members to the board of directors: **R. S. Ingersoll** and **L. G. Porter,** administrative vice presidents; **Robert W. Murphy,** vice president and general counsel; and **Albert Steg,** treasurer and controller.

W. O. Satterwhite has been elected vice president—West Texas division, and **W. L. Carwile, Jr.** has been elected vice president—Oklahoma division of **Welex Jet Services, Inc.** Satterwhite joined the company as assistant manager and salesman in the Odessa district in 1948. He was promoted to manager of the North Texas district in March, 1951, and was named West Texas division manager in October. Carwile joined Welex in 1948 as assistant manager of the Ardmore, Okla., district and became sales engineer in February, 1949. The next August he was named Oklahoma district sales manager, and became Oklahoma division manager in 1950. Other promotions recently announced by Welex include: **C. T. Patten** named district manager for the Falfurrias, Texas, service office; **Clair E. Mullins** appointed manager of the new office in Winfield, Kansas; **Bob Colelasure** and **B. B. McKnight** appointed sales engineers at the Great Bend, Kansas, district office; and **Gordon F. McLaughlin, Sr.,** appointed salesman at Pharr, Texas.

FOR SALE

GASOLINE PLANT FOR SALE

Gasoline Plant, located in Brazoria County, Texas, shut down in January, 1954. Had been processing approximately thirty-three million feet of gas daily with absorber pressure approximately six hundred thirty pounds. Plant recovered Propane, Butane, Gasoline, Kerosene and Diesel Oil. Detailed inventory available upon request.

SOUTHERN PRODUCTION CO., INC.
P. O. Box 670, Ft. Worth, Texas

■ WORKOVER RIG, with Wilson giant drawworks, 7¼ x 12 Gardner-Denver pump, NKU Waukesha engines, 87' L. C. Moore mast, substructure, pipe racks, walkways, blowout preventers, light plants, rotary, block, hook, swivel, water pumps, coring reel, bunk & tool houses, air tubing tongs, drill pipe tongs, bug blower, kelly, small equipment and tools. Rig is complete and in excellent condition. Reasonable price. Detailed inventory available. Chet Whaley Well Servicing Co., Inc., 6006 Milart Street, Houston 21, Texas, Telephone: OLive 4-3261.

Plant in North Ireland To Be Opened by Mission

Mission Manufacturing Company will soon open a new manufacturing plant at Belfast, Northern Ireland, to better serve oil operators in areas where British Sterling, rather than American dollars, is the unit of exchange.

Robert H. Anschutz

Robert H. Anschutz, assistant controller of Mission, has been named coordinator to act as liaison man between Houston and British plants. He has been with Mission since 1946.

At the Houston plant, Mission manufactures and markets pistons, rods, valves and seats, liners and gland packings for slush pumps, high pressure plug valves, rotary slips, casing and tubing swabs for drilling and production activity as well as a line of centrifugal pumps for chemical, refining and oil field applications.

McAfee Named Manager Of New J&L Canadian Store

A store was opened in Estevan, Saskatchewan, by the Jones & Laughlin Supply division recently—the sixth J&L supply store in Canada. The new store will serve such southeastern Saskatchewan fields as Midale, Frobisher, Alida, Steelman, Ratcliffe and Lampman, and the Pierson field in Manitoba.

Local store manager will be M. D. McAfee, assisted by salesman R. D. Spenst and storeman Ronald C. Kellington. H. L. Wilkins, manager of J&L Supply division operations in Canada, will supervise the store. H. C. King, from the sales office in Regina, will assist in sales promotion in the Estevan area.

The store will specialize in sale and maintenance of pumping equipment.

Aeroquip Purchases Plant For Canadian Operations

Aeroquip Corporation, manufacturer of flexible hose lines, with detachable, reusable fittings, and self-sealing couplings, has announced the purchase of a newly completed plant in Toronto, Canada.

The new quarters contain 30,000 square feet of factory area and offices for Aeroquip's recently formed Canadian subsidiary, Aeroquip (Canada) Ltd. New facilities were completed at the end of April and are now in operation.

American Machine and Foundry Buys American Iron & Machine

Negotiations have been completed for the sale of all stock of American Iron & Machine Works Company of Oklahoma City to the American Machine and Foundry Company. The firm will be operated as a wholly-owned subsidiary of American Machine & Foundry.

The new board of directors of American Iron includes Chairman Morehead Patterson, also chairman of the board and president of American Machine and Foundry; Rodney C. Gott, executive vice president, AMF; Robert W. Kerr, vice president, AMF; George A. Ingalls, vice president and controller, AMF; M. G. McCool, president, American Iron; E. E. Rubac, executive vice president, American Iron; J. A. Gray and A. J. Farfel, public members.

Operators are finding that DIAMONDS REDUCE CORING AND DRILLING COSTS

FORMATION BIT SIZE	TOTAL FOOTAGE	PENETRATION RATE	NET BIT COST	BIT COST PER FOOT	DRILLING CONDITIONS BIT LOAD POUNDS	RPM	FL. VOL.
NORTH FOX BUSH UNIT, BUTTER COUNTY, KANSAS							
Sand (Fractured)	649 ft.	2.7 ft./hr.	$1,188.35	**$2.40**	12,000	75	170 gpm
6⅛" x 3½" Core Bit					16,000		
WILDCAT FIELD, RIO BLANCO COUNTY, COLORADO							
Sand (Fractured) and Shale	649 ft.	2.7 ft./hr.	$1,004.73	**$1.55**	8,000	60-65	380 gpm
8⅝" x 4" Core Bit					18,000		
BISTENAU FIELD, WEBSTER PARISH, LOUISIANA							
Limestone	456 ft.	2.8 ft./hr.	$1,436.57	**$3.15**	6,000	90-100	120 gpm
4¾" Drilling Bit							
SOUTH COAL CREEK FIELD, NATRONA COUNTY, WYOMING							
Sundance Red Beds	760 ft.	3 ft./hr.	$ 750.08	**$ .99**	5,000	120	100 gpm
4 11/16" Drilling Bit					6,000		

Christensen's now offer diamond core and drill bits on a rental basis. For information and price per foot rental costs contact the sales and service office nearest you.

CHRISTENSEN CHRISTENSEN **DIAMOND PRODUCTS**

1937 SOUTH SECOND WEST • SALT LAKE CITY, UTAH

Jones & Laughlin Moves Store Site

Jones & Laughlin Steel Corporation, Supply division, now occupies this new store building in Mt. Pleasant, Mich., on Highway 27 North, with adjacent warehouse and yard. Previous store site was a downtown location.

competition *makes it better!*

Competition puts the new look into products and new efficiency into services. And the *customer* benefits! Competition makes oil well cementing service better, too. On your next cementing job, call in the company that *put* competition in the business... and put the alert, new look in equipment and methods.

Engineered answers to oil well cementing

BJ SERVICE, INC.

FOR DETAILS, SEE PAGE 71

Byron Jackson Co. Acquires Drill Pipe Protector Patents

Byron Jackson Company has acquired world-wide patent rights from Huntsinger Associates for the Vetco "Off-n-on" drill pipe and casing protector, formerly manufactured and distributed by Ventura Tool Company. Patent transfer is retroactive to March 28, 1955.

This addition to the line of PB rubber products will be known as the PB Safe-Lok Protector. It will be manufactured at Byron Jackson's PB rubber plant in Los Angeles and distributed by the company's Oil Tool division.

A basic well-drilling item, the Safe-Lok Protector is a protective rubber bearing which is locked around drill pipe to reduce shock and wear inside the well casing. Installation and removal may be done by drilling crews without the use of special equipment. The Protector can be snapped on and off the pipe and used repeatedly.

Harlan C. McKay Company To Handle Clark Automotive Line

Harlan C. McKay Company has been appointed to sell and service Clark Equipment Company's complete automotive line of axles, transmissions, torque converters and packaged power trains in Idaho, Oregon, Washington, British Columbia and Alaska.

Harlan C. McKay, president of the newly appointed distributorship, has long been assocaited with the sale of engines and associated equipment to trucking and machinery manufacturers and to companies in the construction, logging, transportation and other industries in the Pacific Northwest. Prior to opening his business he was northwest regional sales manager for the Buda Company and sales manager for Cummins Diesel Sales, Inc.

Dowell Establishes Scholarships At Seven U. S. Universities

Dowell Incorporated has announced establishment of seven scholarships and two fellowships in the fields of engineering and chemistry totaling $750 annually. First awards will be available for the 1955 school year.

The scholarships, providing $500 for a senior sudent in petroleum or geological engineering, have been awarded for the 1955 academic year to Oklahoma A. & M., University of Oklahoma, Kansas State, University of Kansas, University of Texas, Louisiana State and Colorado School of Mines.

Graduate fellowships in chemistry for the same period were announced for Kansas State and University of Texas. These provide $1500 for the student and $500 to the university for equipment and supplies used by the fellowship student. Selection of the students for both the scholarships and fellowships will be made by the college deans and professors in charge of departments from which the students are chosen.

Du Pont Names Distributor For Drilling Mud Chemical

Barada & Page, Inc. has been appointed distributor of the new sodium carboxymethyl cellulose (CMC) recently introduced by E. I. du Pont de Nemours & Company for use in drilling muds. The company will service mud dealers from stocks of the new chemical at branch warehouses in Houston, New Orleans, Corpus Christi, Dallas, Odessa and Oklahoma City.

LeTourneau Official Cited

Richard L. LeTourneau, vice president of R. G. LeTourneau, Inc., recently received a special citation from the College of Engineering of New York University. Dean Thorndike Saville presented the award to LeTourneau for achievement in the development of electrically propelled and operated heavy machinery for land clearance, logging and general off-road transportation.

Drexel Canadian Equipment, Ltd. To Handle King Oil Tool Products

Drexel Canadian Equipment, Ltd., of Edmonton, Alberta, has been appointed distributor of King Oil Tool products, headquarters for which are located in Houston, Texas. Jerrold Drexel, president of the Canadian firm, has had wide experience with oil field equipment, including service with Waukesha Sales and Service and Well Equipment Manufacturing Corporation, both of Houston. Prior to this work, Drexel was associated with drilling contractors in the field. He has operated the drilling and servicing equipment firm in Edmonton for more than three years.

Jerrold Drexel

Edward Names Hearty & Co. Arizona, Nevada Representative

F. J. Hearty & Co. of Los Angeles, representative for Edward Valves, Inc., now represents Edward in Nevada, Arizona and California.

One of the original Edward representatives, F. J. Hearty & Co. first signed a contract with Edward Valves in 1925. They will continue to handle the complete Edward line of forged and cast steel valves for boiler rooms, petrleum service and industrial and technological plants.

Blast Furnace Back on Line At Kaiser Steel's Fontana Mill

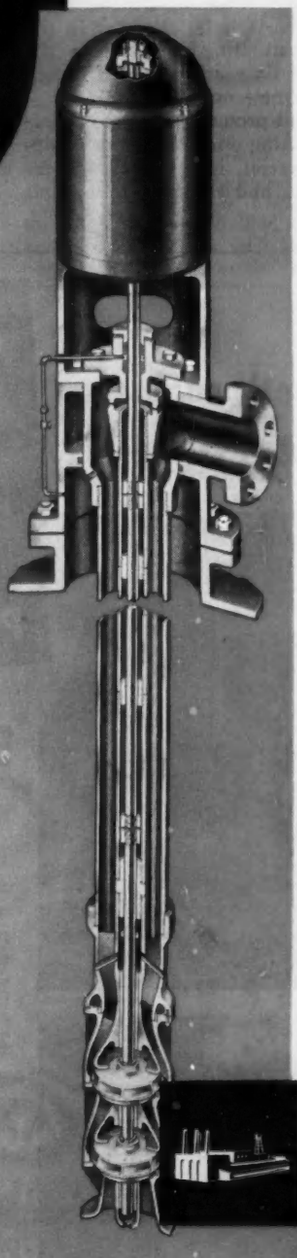
The number two blast furnace at Kaiser Steel Corporation's steel mill at Fontana has gone back into production after completion of a record 34-day relining job.

The job was done by a bricklaying crew from A. E. Anderson Construction Corporation, augmented by Kaiser Steel's own crew of mechanics and riggers, working around the clock.

Kaiser's three blast furnaces, the only ones on the Pacific Coast, provide pig iron for the company's nine open hearth furnaces. Enough bricks to build 65 three-bedroom homes went into the lining of the blast furnace.

Verti-Line PUMPS *were first— are first*

1st.



Virtually every major turbine pump improvement has been pioneered by the makers of Verti-Line Pumps. For instance:

first to produce a vertical pump for small diameter casing.

first to place the line shaft inside of the discharge pipe enclosed in a protective tube.

first to introduce line shaft lubrication from surface of ground.

first to introduce a full-floating ball thrust bearing head.

first to design high efficiency enclosed impellers.

first to introduce factory practices to insure proper shaft alignment.

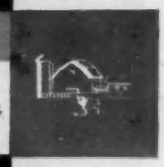
first to introduce and pioneer the hollow-shaft motor head.

first to adopt the streamlined, weatherproof, built-in motor.

first to employ highly technical methods for statically and dynamically balancing rotating parts.

LAYNE & BOWLER will continue to be FIRST in presentation of improvements.

in all industry



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American Air Filter Company Opens New Denver Office

A new branch office to handle the sale of Herman Nelson products has been opened in Denver by American Air Filter Company, Inc., Louisville. Located at 1660 Gilpin Street, the office will cover the Colorado and Wyoming district.

Cyril DiMercurie, sales engineer in the heating and ventilating industry in the Denver area for six years, has been named manager of the new operation.

The office will promote the sale of Herman Nelson heating and ventilating equipment to commercial, institutional and industrial markets, and Herman Nelson unit ventilator equipment to the school field.

Air Filter products of the company in the Denver area will continue to be handled by the Herman & von Rosenberg organization. American Air Filter dust control products will remain with Richards and Associates.

Technical Oil Tool Firm Completes Service Meetings

Technical Oil Tool Corporation has announced the recent completion of the company's annual series of service meetings for TOTCO field representatives in the Mid-Continent area. Meetings were held in Houston, Oklahoma City and Odessa. Each TOTCO service representative attended one of the meetings.

S. D. Wiginton, Jr.

Joe W. Beane

Baroid's Midland Office Made Headquarters for West Texas

Baroid division, National Lead Company, has expanded service in the West Texas and Permian Basin area. The present office in Midland has been made operational headquarters for a new West Texas area to provide increased service to the drilling industry with more personnel available for consultation on mud program planning and control.

S. D. Wiginton, Jr. has been appointed manager of the area. Formerly superintendent of Baroid's Midland district, he has been with the company 13 years, nine of which have been in West Texas.

Joe W. Beane, superintendent of the Abilene district, has been appointed assistant manager of the West Texas area. He has had 13 years experience with the company.

D. D. Varnell, sales representative for this area, has been with Baroid over 17 years most of this time spent in the Rocky Mountain and West Texas areas. Homer C. Leland, appointed area engineer, will be available for consultation and guidance in all districts under the West Texas area. Leland has been with Baroid seven years, with over five years experience with mud programming in the West Texas oil fields.

American Sand-Banum Company Moves Executive Offices

American Sand-Banum Company, Inc., has announced removal of executive offices from Rockefeller Plaza to Meadow Brook National Bank Building, Freeport, N. Y. Factory and other facilities will remain at their present location.

Otis Pressure Control Opens Oklahoma Branch Office

Otis Pressure Control, Inc., has opened a district office in Lindsey, Okla., at 813 West Cherokee Place. Louie Payne and Raymond Fitzpatrick are in charge of the branch.

Rockwell Manufacturing Company Changes Name of Subsidiary

Rockwell Manufacturing Company has changed the name of its Canadian subsidiary—Callander Foundry and Manufacturing Company, Ltd., Guelph, Ontario—to Rockwell Manufacturing Company of Canada, Ltd.

Purchased by Rockwell in November, 1953, the Canadian firm is Canada's largest producer of power tools for home and industry. It also turns out a line of electrical conduit fittings.

The name was changed to reflect more accurately the current operational scope of the Guelph concern, now producing various Rockwell power tool and meter products in addition to products originally manufactured under the Callander name.

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we're both engineers
–but we specialize to

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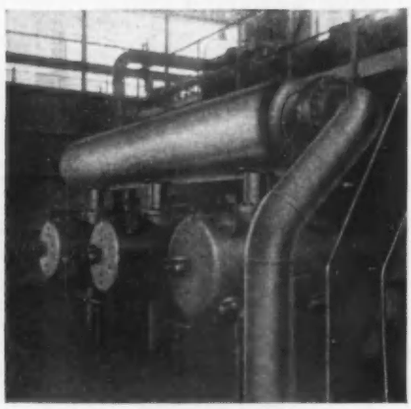

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1. the type of plant undertaken (petroleum, chemical, industrial or power plant);
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FREE *Six case histories showing successful installations. Your specific problem may be explained. Write today.*

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Dallas, Texas

Plan General Motors Show

Planning a giant show of diesel and aircraft power are Harlow H. Curtice, left, president of General Motors, and C. R. Osborn, vice president in charge of GM's Engine Group. Here they inspect a scale model of "General Motors Powerama," outdoor exposition scheduled for August 31-September 25 in a million-square-foot site on Chicago's lakefront. In addition to varied entertainment, Powerama will feature machines and other equipment produced or powered by GM's diesel, aircraft and heavy equipment divisions.

Security Engineering Moves Executive Offices to Dallas

The executive offices of Security Engineering Division, one of the Dresser Industries, have been moved from Whittier, Calif., to Dallas, Texas. Security's management will make their headquarters in the Atlantic Building at Dallas, pending completion of executive offices now under construction at their Dallas plant.

An intensive expansion program is underway at both Security's Whittier and Dallas plants. New machinery, additional personnel, and an increase in floor space is slated for each plant.

Waukesha Sales & Service Opens New Branch in Pampa, Texas

Waukesha Sales & Service, Inc. has opened a new branch in Pampa, Texas, to provide better service for customers in the Texas Panhandle. The branch is located at 2308 Alcock St.

Leon Miller is manager of the Pampa store and district manager of the Texas Panhandle area for Waukesha Sales & Service. He has been resident representative for the company in Pampa for four years. John D. Pharr is parts manager. He was transferred to Pampa from Waukesha's Shreveport branch. He has been with the company for five years serving in Louisiana, East Texas and north Texas.

Larkin Begins Construction Of New General Office Plant

The construction of a new plant and general office headquarters for the Larkin Packer Co., Inc., providing for more than a 40 percent expansion of its oil field equipment manufacturing facilities, has been started in Waxahachie, Texas. The new plant will occupy a 28-acre site, and, when completed late this year, it will provide approximately 70,000 square feet of modern shop and office space.

When the new plant is completed, the company plans to move its entire general office and manufacturing operations to Waxahachie.

New Sherman, Texas, Store Opened by Wilson Supply

The Wilson Supply Company of Houston recently opened its new store at Sherman, Texas, to serve Sherman and adjacent areas. Cecil Kirkland has been named store manager.

White Motor Announces Special Products Division

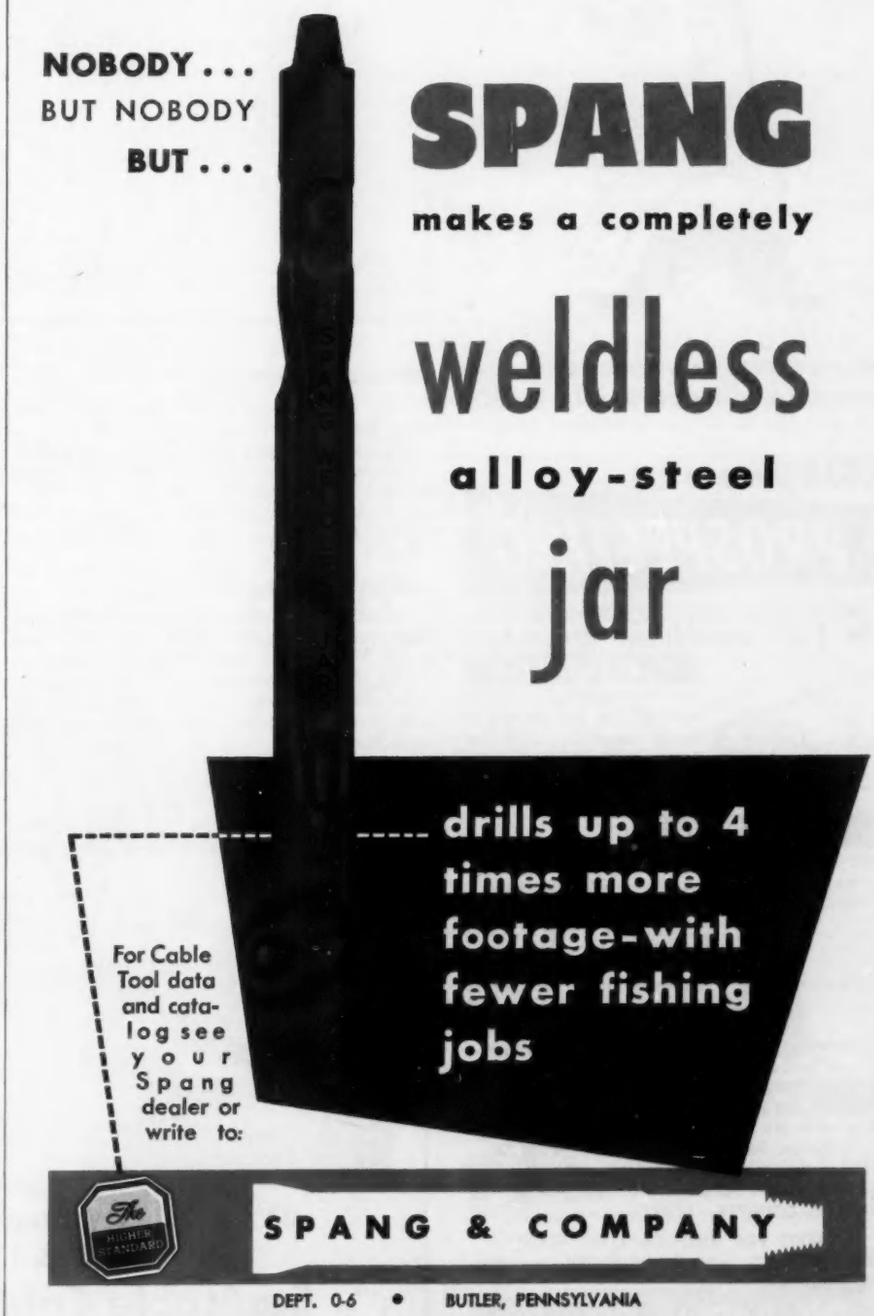
Formation of a Special Products division to handle development and manufacture of a diversified line of non-automotive products has been announced by The White Motor Company. Kenneth F. Ode, manager of government contracts for White, has been appointed general manager in charge of the new division.

White has been producing a number of non-automotive products for both civilian and defense customers. Establishment of the new division consolidates the manufacture of the products under a separate and distinct heading. The new division also opens the way to the development of new fields of activities for the company.

Tuboscope Expands in Merger With Subsurface Engineering

Effective May 1 Subsurface Engineering Co., specialists in developing data for reservoir analysis, merged with Tuboscope Company, non-destructive testing and wireline service company. This merger will result in a stronger and larger organization able to carry out research and field work needed to serve the expanding oil industry.

The subsurface Engineering division of Tuboscope will offer complete wire line services, bottom hole temperature and pressure surveys, as well as other surveys needed by reservoir engineers.



For over 60 years Manufacturers of Spang Weldless Jars and a Complete Line of Cable System Drilling and Fishing Tools for Oil and Gas Wells, Prospect Drilling and Shot Blast Holes.

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SEE PAGE 183. For information write Box 100-W, c/o World Oil, Houston, Texas.

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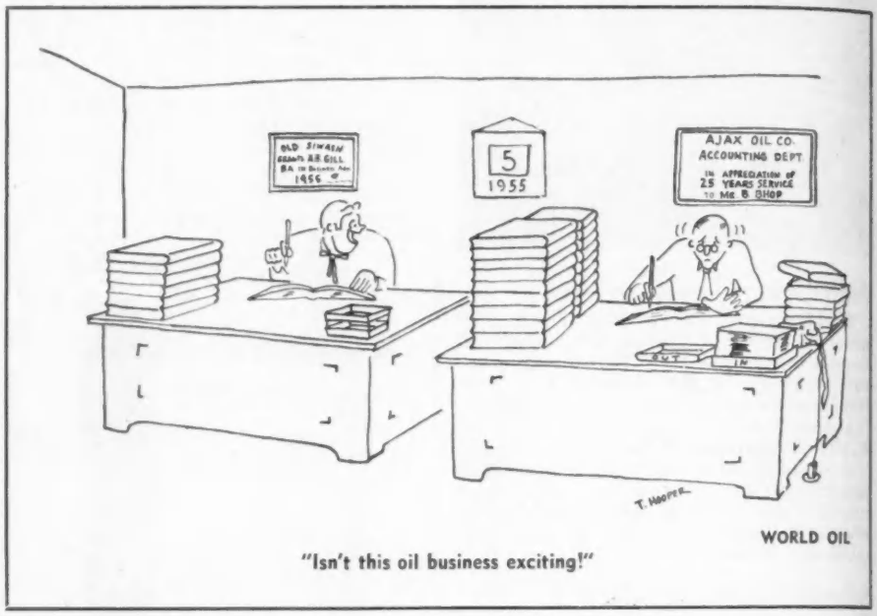

"Isn't this oil business exciting!"

Mistaken Identity

Her husband gave her a beautiful skunk coat for Mother's Day.

"I can't understand," she remarked, "how such a nice coat can come from such a foul-smelling little beast."

"I don't ask for thanks," replied her husband, "but I do demand respect."

An Interesting F

Teacher (to history student): "So you want to know why you didn't pass your test? Well, your answer to the question, 'Why did the pioneers go into the wilderness' was interesting from the standpoint of sanitation and romance, but it was still incorrect!"

Road Courtesy

Wife: "Don't drive so fast, George. The policeman on the motorcycle right behind you wants to get by."

Proof

"I've been here 40 years in business," said the cantankerous old fellow, "and I see no need of advertising."

The salesman for the big city newspaper had heard such statements before.

He pointed up the street. "How long has that church been there?"

"'Bout a hundred years."

"They still ring the bell, don't they?"

Mother's Nature

Two explorers met in the virgin forest. In the course of their conversation, one said, "I came in order to become acquainted with new horizons, to experience an unviolated solitude, to appreciate the grandiose charms of savage nature. And you?"

"I," replied the second explorer, "came because my little girl has just started taking piano lessons."

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Accuracy of McCullough Scintillation Counter Shown by Sharp Definition of Thin Beds

The McCullough Radiation Well Logger utilizes a very sensitive radiation detector –the highly efficient McCullough Scintillation Counter. It is a dense, transparent body that converts gamma rays and the energy from neutrons into light, called "scintillations."

This scintillation counter has an efficiency approaching 100% in its ability to detect radiation. Because of this efficiency the counter need only have an effective length of from 2 to 3 inches. Therefore, it will sharply define lithologic boundary changes and will clearly define thin beds.

A striking example of this efficiency is demonstrated by the following field report on a series of logs run in numerous wells in a Canadian oil field.

At one end of the field the main sand is water loaded except for top streaks. This top sand is about 12 inches thick with thin lenses of sand and shale over it. Usually a single string of 5½" casing is set through the pay zone which lies at approximately 3200'.

The perforator is positioned from McCullough Gamma Ray Log measurements and a simultaneous collar log. Usually one to three feet of zone are perforated with eight holes per foot. Shooting just a few inches too high means no production—a few inches too low results in water and hazardous squeezing operations.

The fine detail and extreme accuracy of the McCullough Log accurately pin points the thin sands for successful completion.

McCullough Radiation Well Log Finds Casing Set Too Low

Helps Turn a Three Year Old Abandonment Into a Profitable Completion

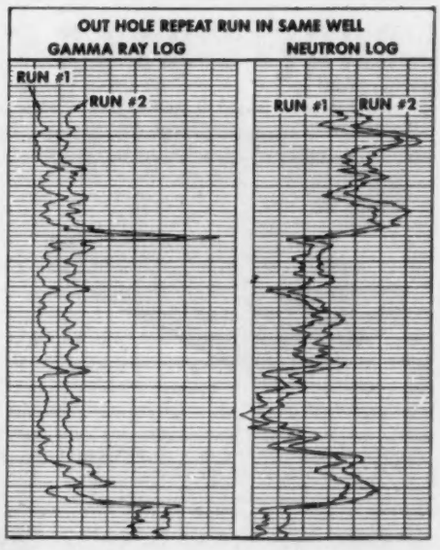
Converting an abandoned well into a flowing one was the subject of a recent job report from a McCullough Wyoming Branch Manager.

This well had been drilled about three years ago and had never been a producer. 5½" O.D. casing had supposedly been set on top of a sand formation that looked promising.

McCullough ran a Radiation Log to total depth and found that the casing had actually been set within six inches of the bottom of the sand. Nearly all the productive area had been cased off.

Using a combination of M-3 Bullet Guns and Super Casing Glass Jets, 120 holes were shot through the casing in a 15 foot interval at 3655'. The well started flowing immediately after perforating and has continued to be a good producer.

Jobs like this, where a total loss has been changed to a profitable completion, are a tribute to the extreme accuracy and efficiency of the McCullough Radiation Well Logger. However, equal credit for the production obtained must be given to the deeper penetrating abilities of McCullough Perforators.



Stability is an important characteristic of the McCullough Radiation Well Logger. It will faithfully duplicate results when run repeatedly under identical conditions. The curves above were made on successive runs in the same well and then placed side by side to show consistency and repeatability.

McCullough Radiation Well Logger locates formations of interest with pin point accuracy

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PRESSURE MAINTENANCE WITH GAS OR WATER

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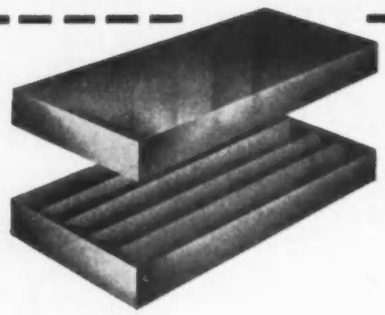
CORE BOXES



Each box holds 10 feet of core, and has following copy on end:
Hole_____From_____
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"Project Name" printed on top and bottom of box.

Size	Length		Width		Depth
AX CORE BOX	24	x	8¼	x	1⅜
BX CORE BOX	24	x	9½	x	1¾
EX CORE BOX	24	x	7	x	1⅛
NX CORE BOX	24	x	12	x	2¼
SPECIAL 2½" CORE BOX	24	x	13⅜	x	2⅝
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Quick, dear . . . Junior just spoke his first words . . . I think!"

No More Questions

A customs officer asked this routine question of a feminine traveler: "Anything to declare, madam?"

"No, not a thing."

"Then am I to understand, madam, that the fur tail hanging down from under your coat is your own?"

Revitalizer

The farm hand and his girl were out buggy riding when, about nine miles out of town, the horse dropped dead. "Oh, dear," sighed the girl, "I'm just too tired to walk clear home."

"Suppose," suggested the farm hand, "I give you a little kiss. That should put some life in you."

"In that case," replied the girl, "I suggest you kiss the horse."

No Secrets

"Now, what's the most you have ever weighed?" the doctor asked.

"One hundred twenty pounds," she replied.

"And the least?"

"Five pounds, six ounces."

Letter of the Law

Luke: "I was not drunk, your honor; I had only been drinking."

Judge: "Oh, that's different. In that case I'm not going to send you to jail for a month, but only for 30 days."

Heigh Ho!

The elderly gentleman was walking past a drug store when, without warning, a young man dashed out of the shop, took a flying leap into the air with his legs astride, and fell in a heap in the gutter.

The older man hurried over to him. "Dear, dear!" he said sympathetically. "Are you hurt?"

"NO," was the sharp reply. "But I'd like to meet the guy who took my bike away!"

Do As I Do

Professor: "Too bad. One of my pupils to whom I have given two courses of instruction in the cultivation of the memory has forgotten to pay me, and, the worst of it is, I can't think of his name."

Look Again

"Baby, your eyes fascinate me. They got dew in them!"

"That ain't dew, big boy: dat's don't!"

Stickler for Detail

Joe: "Say, bud, what's that book you're readin'?"

Bud: "'What Twenty Million Girls Want'."

Joe: "Ha! Lemme see it—I wanta see if they spelt my name right!"

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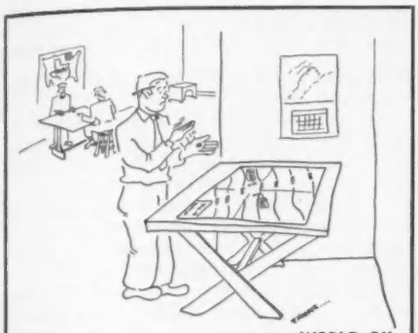

WORLD OIL

"I see the boss just spotted the No. 1 Smith wildcat."

A Little Knowledge

While a farm girl was milking a cow, a bull tore across the meadow toward her. The girl did not stir, but continued milking.

Observers, who had run to safety, saw to their amazement that the bull stopped dead within a few yards of the girl, turned around and walked sadly away.

"Weren't you afraid?" they all asked.

"Certainly not," said the girl. "I happened to know this cow is his mother-in-law."

There Is a Difference

Two golfers were annoyed by an unusually slow twosome in front of them. One of the offending couple dawdled on the fairway, while his companion searched long and industriously in the rough.

At length one of the pair waiting on the tee shouted indignantly, "Why don't you help your friend find his ball?"

"Oh, he's got the ball," the man replied blandly. "He's looking for his club."

Magic Word

Meeting at a social gathering, a lawyer called a physician friend aside and said, "I hate to come to these things. People are always asking for free advice. Do you have to put up with that too?"

"Why, yes, people are always approaching me for free medical advice," said the doctor, "But I stop them in the midst of reciting their symptoms with a curt arbitrary command—'Disrobe.' After that, I really have no trouble."

Too Difficult

Serious young man: "Do you enjoy Kipling?"

Giddy girl: "I don't know—how do you kipple?"

No Davy, He

A Boston salesman visited Texas and heard one particular Texan boasting about heroes of the Alamo who, almost alone, held off whole armies.

"I'll bet you never had anybody so brave around Boston." challenged the Texan.

"Did you ever hear of Paul Revere?" asked the Bostonian.

"Paul Revere?" said the Texan, "Isn't that the guy that ran for help?"

Extra Service

Waiter: "May I help you with that soup, sir?"

Diner: "What do you mean? I don't need help."

Waiter: "From the sounds you're making I thought you wanted to be dragged ashore."

Geologists:

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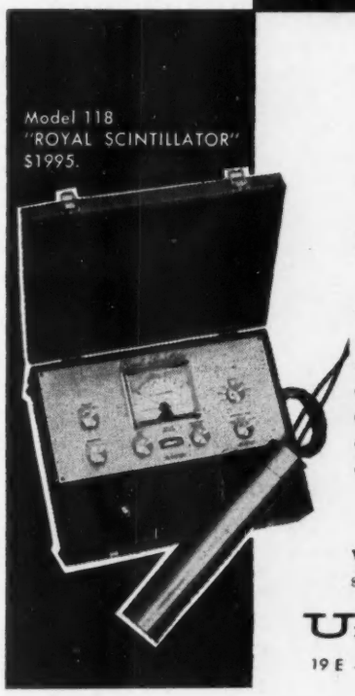

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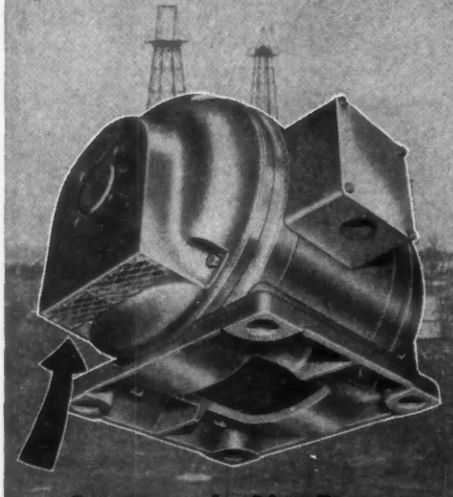

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FIELDMASTER Ball Bearing Motors, for example, have been specially designed and built to more than handle the rugged requirements of oil field use. High slip is available to take care of reciprocating load requirements encountered in pumping . . . wide variety of windings provides triple ratings, dual voltages . . . high torque licks heavy starting problems . . . high-grade silicon steel in the magnetic circuit reduces iron losses . . . heavy-duty, double-shielded pre-lubricated bearings increase performance, reduce lubrication problems . . . heavy cast base assures alignment stability.

These are just a few of the many facts which prove FIELDMASTER Ball Bearing Motors are second to none. Our distributor, the Bethlehem Supply Company, will gladly supply you with **ALL** the facts . . . **without obligation.** May we have them contact you?

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Type "H" Mill

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Kinzbach Whipstocks can be set at any depth and require no support for the bottom. Positive setting slips prevent slipping or turning in the hole. The Kinzbach hinge arrangement assures that the top of the Whipstock will be close against pipe wall at all times, permitting easy passage of drilling tools. Setting trigger always locates the Whipstock between couplings so that the window will be within one joint. Kinzbach Whipstocks are available in all popular casing sizes through your supply store.

Use Kinzbach Milling Tools for every whipstocking or metal cutting operation. They have high-speed tool steel inserts which are ground and set at the most efficient angle for fast, uniform cutting action. Shown at left are four popular models—see your Kinzbach Catalog for a description of the complete series of Milling Tools.

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New Books . . .

GEOLOGY PRINCIPLES AND PROCESSES, Fourth Edition, William H. Emmons, George A. Thiel, Clinton R. Stauffer and Ira S. Allison, McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 36. $6.50.

A comprehensive, basic study of the science of geology, the book is simply written and logically arranged, avoiding detailed chemical formulae and equations throughout the text. Topics of the previous edition, published in 1949, are reorganized, revised and augmented by new information based on recent research. New drawings, photographs and charts illustrate the expository sections of the book. Chapters are followed by references to source material and supplementary reading.

New material includes a presentation on chemical weathering, a chapter on the work of the wind, an expansion of erosional processes in desert environments, a discussion and classification of soils and a summary of the work of ice, snow and permafrost in the arctic. A more complete presentation of shore-line erosion and deposition by waves, and additional data on origin and geological setting of non-metallic mineral resources are included. New concepts regarding mobility of rocks in relation to mountain building also are presented.

Copies of the book can be purchased through the Gulf Publishing Company, P. O. Box 2608, Houston 1.

•

THERMODYNAMIC PROPERTIES OF METHANE-NITROGEN MIXTURES, O. T. Bloomer, B. E. Eakin, R. T. Ellington and D. C. Gami, Institute of Gas Technology, Technology Center, Chicago 16, Ill. $3.50.

Data required for computing energy requirements of processes to separate nitrogen from natural gas by liquefaction and distillation are presented in this latest IGT research bulletin. Use of these data for calculation of conditions and heat requirements for selected separation cycles employing distillation is illustrated. Comparative energy requirements, based on attainable compressor and expansion turbine efficiencies, for five cycles with varied operating conditions, are tabulated.

Included among illustrations are Mollier charts for nitrogen and methane and a temperature-entropy chart for methane.

The bulletin is one of a series published by the Institute of Gas Technology. This study was sponsored by the Pipeline Research Committee of the American Gas Association.

•

GEOLOGIC MAP OF WYOMING, compiled by J. D. Love, J. L. Weitz and R. K. Hose, United States Geological Survey, Denver Federal Center, Denver. $2.50.

Compiled from more than 200 detailed and reconnaissance maps, this new geologic map of Wyoming was prepared by the United States Geological Survey with the co-operation of the Wyoming Geological Survey and the University of Wyoming Department of Geology.

The map shows distribution and structural trend of numerous geologic units. Major mountain ranges in the state, for the most part, are shown by a pattern for pre-Cambrian rocks surrounded by concentric bands for outcrops of Mesozoic and Cenozoic rocks. Large scale systems of folded rocks are indicated by parallel outcrop patterns. Large faults are also shown.

DRILLING AND PRODUCTION PRACTICE, 1954 Edition, American Petroleum Institute Division of Production, 300 Corrigan Tower Building, Dallas 1, Texas. $5 postpaid within the U. S.; $5.25 for foreign shipment.

This volume contains 28 papers including a symposium of offshore operation comprised of eight papers selected from those presented during 1954 at Division of Production district meetings and annual-meeting group sessions. Papers on surface equipment, bits, drill stems and casing, cements and cementing, drilling fluids, reservoir analysis and corrosion are among others included. A bibliography of all papers presented at district meetings is also given.

•

FOUR CORNERS AREA REFERENCE BOOK, Rinehart Oil News Company, P. O. Box 1208, Dallas, Texas.

This new reference book covering the Four Corners area of southeast Utah, southwest Colorado, northwest New Mexico and northeast Arizona is the first complete presentation of the region's historical background and future prospects.

In addition to approximately 40 field, county and geological maps and more than 50 electrical logs of key wells, the publication carries special articles by Dorsey Hager, Sherman A. Wengerd, Frank C. Barnes, J. L. Tatum, Ralph A. Bieberman and R. R. Spurrier, all Four Corners area geologists. Other information includes basic data on discoveries, producing zones, number of wells drilled and deepest tests.

•

PRIMER OF OIL & GAS LAW IN TEXAS, John S. Roberts, Belltex Publishing Company, P. O. Box 3123, Bellaire, Texas. $1.25.

To provide a background for the layman, this new book briefly states highlights of mineral law and practices used in the petroleum industry. Based on laws and rules of the State of Texas, it is not intended as a treatise on oil and gas law, nor is it to be used as legal counsel or direction. The book is written in easy to understand lay language for geologists, engineers, accountants, personnel directors, junior landmen, students and others without legal training who are confronted with problems, terms and expressions of the industry. Technical terms and phrases are avoided whenever possible.

•

AUTOMATIC CONTROL BIBLIOGRAPHY, Warren F. Wade and Emory N. Kemler, Summary Reports, P. O. Box 176, Spring Park, Minn.

This bibliography attempts to summarize the American and English literature relating to the automatic control field, primarily for the period since 1900. One of the problems in use of a bibliography is that it is frequently difficult to ascertain from the title of the article its general coverage. In order to fill the need partially, a brief abstract is included on most of the articles. These abstracts do not attempt to evaluate the importance of the article, but rather to convey a general idea as to the type of material included in the article.

•

More Fanning Books Soon

The first edition of Leonard Fanning's "Foreign Oil In The Free World" has been completely sold out and the publishers are now running a second edition.

The guy on the right is Joe Roughneck. He's the brains and the brawn of the oil industry. Whether he is on a rig in the field or whether he has moved up to be president of his company . . . he knows oil . . . and pipe.

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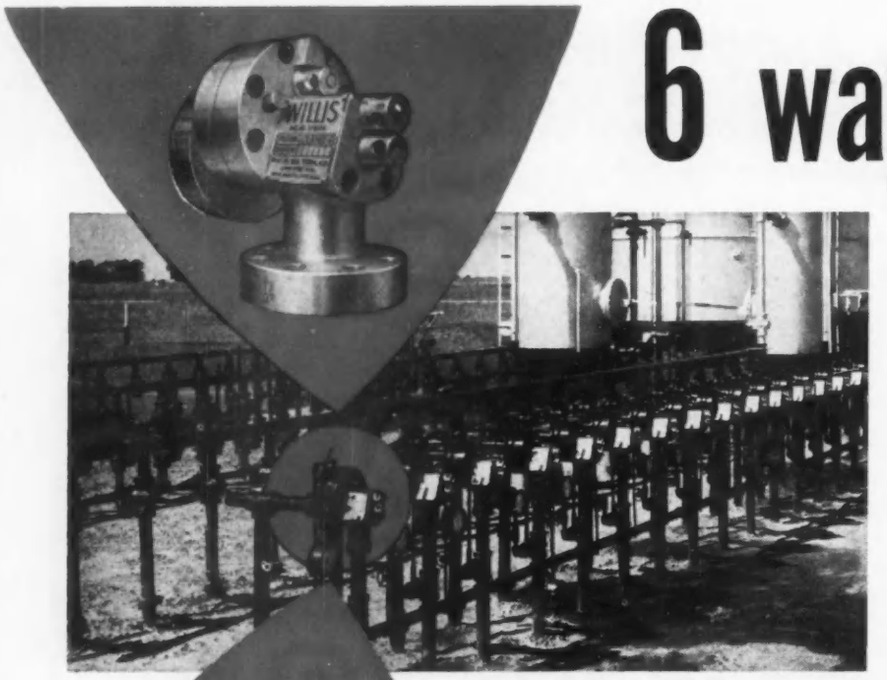

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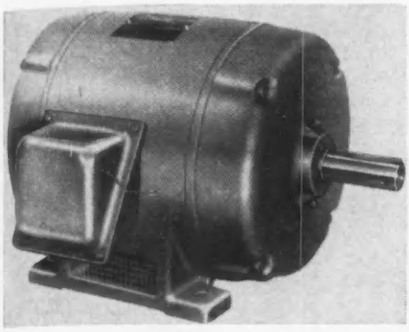


Pumping Motors

A new line of oil well pumping motors in rerated NEMA frame sizes 182 through 326 has been announced by Wagner Electric Corporation. Designed especially for oil field service, the new motors have corrosion-resistant, smoothly contoured cast iron frames. Virtually splashproof by virtue of dripproof construction, they operate at 40° C continuous duty rated temperature rise and have a service factor in accordance with NEMA standards.

For protection from rain, snow and sand, motor ventilating air intakes are located at the bottom of the endplates. Air outlets are positioned at the base of the frames on each side. All ventilating openings are screened. Extra protection for stator windings is provided by specially-formed baffle plates which also direct air into the blowers and through the motor.

The new design is being used in Wagner polyphase oil well pumping motors in one to 30-horsepower ratings and for one to 10-hp single-phase motors.

For more data circle **No. E1** on Readers' Service Card, last page this issue.

Centrifugal Pumps

Development of three centrifugal pumps, designed for rugged oil field service, has been announced by the Byron Jackson Co. The new washdown and brake cooling pumps, mud processing and supercharging pumps and pneumatic sponge pump all utilize an exclusive case and impeller design that allows high pressures to be delivered with lower power requirements. The semi-open impeller is constructed of heavy cast iron to provide extra strength for high capacity operation.

The new mud processing and supercharging pumps are designed to increase efficiency and capacity of slush pumps or to eliminate use of high pressure reciprocating mud pumps. A medium capacity pump, which has a rating of 1000 gallons per minute at a pressure of 37 psi, and a high capacity pump, which will handle 1200 gallons per minute at 50 psi, are available.

The new washdown and brake cooling pumps are designed to be driven by belt or by direct coupling at speeds up to 2800 rpm and are available in clockwise or counter-clockwise rotation.

Built for heavy duty pumping of fluids containing sand and other abrasives, the high lift sump pump has been developed to operate against heads of 7 to 76 feet with capacities of 50 to 380 gallons per minute. The lightweight pumps are powered by 60 to 100 psi of compressed air and require only connection to an air line and discharge pipe for operation.

(This item supplements Byron Jackson Co. data on Pages 929-930 of the Composite Catalog, 20th Edition.)

For more data circle **No. E2** on Readers' Service Card, last page this issue.

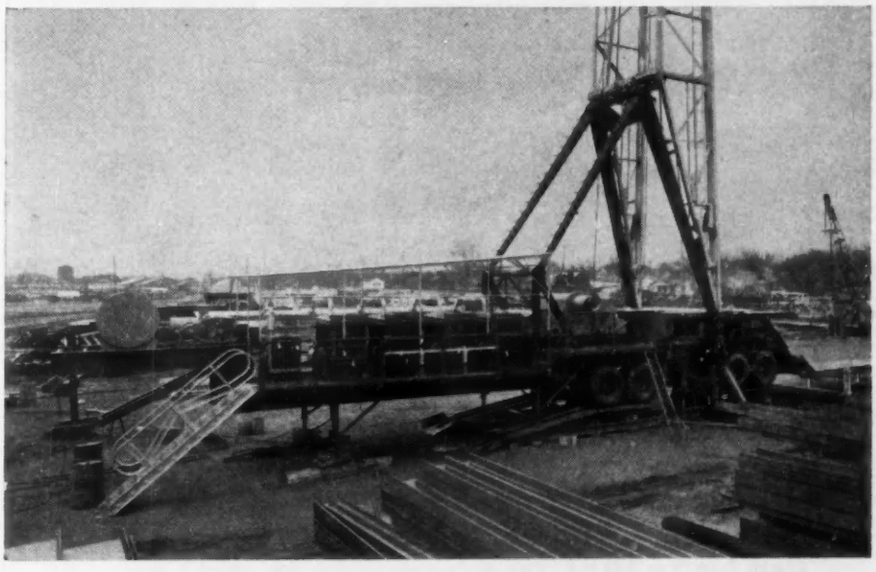
Stick Corrosion Inhibitor

Protection of tubing and casing, even at the bottom of packed-off wells, is now possible with National Aluminate Corporation's stick form corrosion inhibitors. Dropped directly down the tubing with the aid of a simple stick lubricator attachment, the high density, bullet-nosed sticks penetrate fluid and fall to well bottom. Shut-in time for treatment is held to a minimum.

Nalco sticks, 1⅜ inches in diameter and 17 inches long, are offered in LT, MT and HT grades for wells having low, medium or high bottom hole temperature. Each stick contains organic type corrosion inhibitors in an amount equal to those in one quart of Nalco liquid corrosion control treatment. As the stick dissolves at well bottom, inhibitor is carried upward by the produced fluid, coating the tubing with a film that resists corrosive attack.

For more data circle **No. E3** on Readers' Service Card, last page this issue.

DRILLING



Export Rig

A new type export rig was recently developed by Unit Rig & Equipment Company in cooperation with the Export division of Mid-Continent Supply Company and Mid-Continent Export Corporation. Portability and quick rig-up and teardown were the primary considerations in designing the rig. No chain or guard need be broken to move the rig.

The trailer-mounted drawworks is powered by four diesels providing 600 input horsepower to the drawworks. A unique feature is an auxiliary pump drive utilizing a universal-joint drive arrangement from the engine compound to an independent pump unit which consists of two diesels unitized with a pump on a separate trailer. The two engines, providing 300 horsepower for the pump, are supplemented with power from the drawworks drive group through this universal joint.

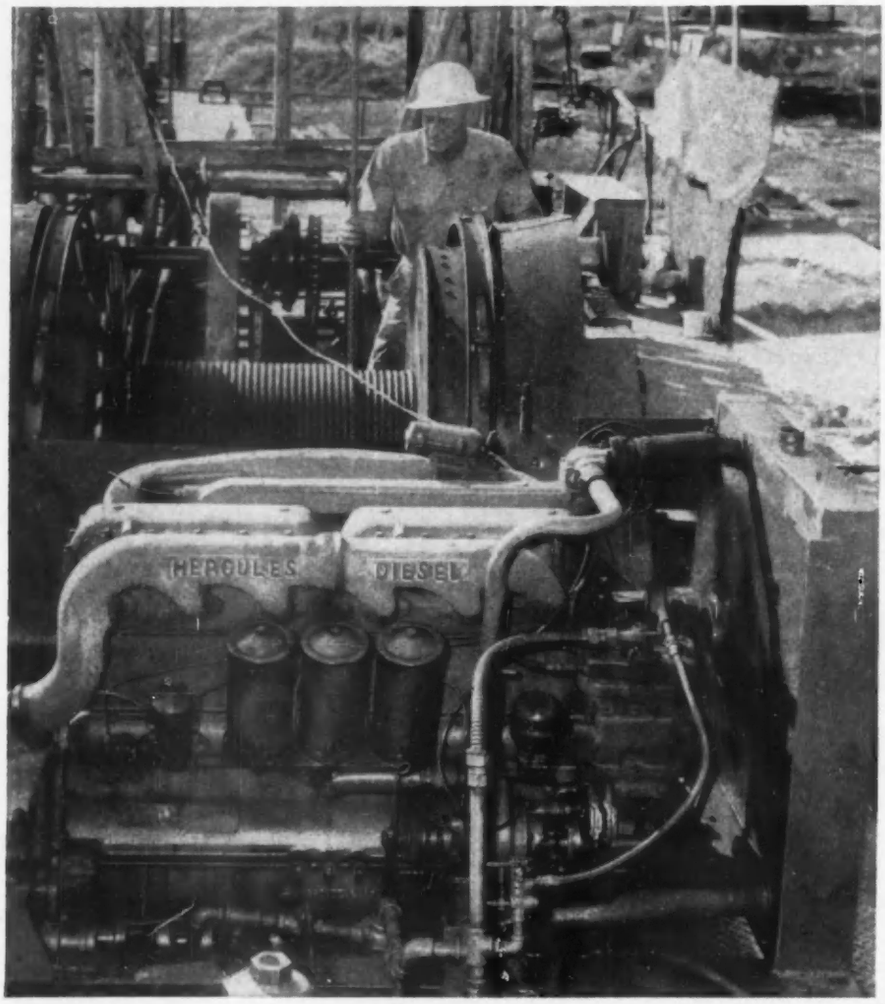
The engines are equipped with torque converters connected to the compound drive unit through clutches. Additional equipment mounted on the drawworks trailer includes a 21-inch rotary table with oil bath drive and guard. Mounted on the trailer gooseneck is a diesel generating set which provides lighting and electric power for the electric driven air compressor unit.

For further unitization, a 300-gallon fuel oil tank and a 75-gallon lubricating oil tank are mounted on the gooseneck with complete manifolds to all engines, thereby providing a closed system.

The mast used with this new type of rig is a 126-foot telescoping mast mounted on a trailer. This mast is constructed with a scissoring bottom section which facilitates narrower road width for moves without sacrificing floor space for operation.

Save time! Keep informed! Circle numbers on Readers' Service Cards, last page this issue.

Case History of Dependable Service



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In addition to this wide selection of engines Hercules Motors Corporation has a large network of service outlets. Hercules branches and distributors are located throughout the oil country to provide expert engine service. Hercules stores are located in Houston, Odessa and Kilgore, Texas; Jacksonville, Fla., Los Angeles, Oklahoma City and Salem, Illinois. You'll also find Hercules distributors in Tulsa, Shreveport, New Orleans, Dallas, Corpus Christi, El Paso, Lubbock, McAllen and Alice, Texas; Great Bend, Kansas and Edmonton, Canada.

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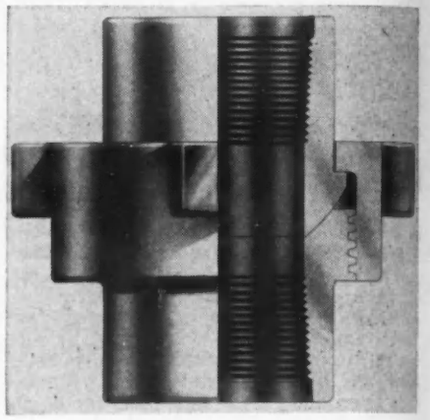
NEW EQUIPMENT . . .

The mast trailer and drawworks trailer are pinned together in the operating position and stabilized by resting on ramp type substructure assemblies, one for each trailer.

(This item supplements Unit Rig & Equipment Company data on Pages 4909-4936 of the Composite Catalog, 20th Edition.)

For more data circle **No. E4** on Readers' Service Card, last page this issue.



Drilling Rig Service Union

A new union, designed especially for drilling rig service by Yale Machine Works, features an efficient seat design that permits easy stabbing of the mating parts, and maintains a positive pressure seal even when parts are as much as four degrees out of alignment.

The union is furnished in sizes from two inches to four inches, for working pressures from 1000 psi to 7500 psi. An auxiliary O-Ring seal, placed on the sealing arc of the male sub, is available for all unions up to 6000 psi test pressure, and is regularly furnished on the 6000 psi and 15,000 psi test pressure unions.

All parts of these unions are capable of withstanding severe service ordinarily encountered in rig work. Sub ends are thicker and hammer lugs are larger and heavier to resist deformation and to provide speed and safety in making up the wing nut.

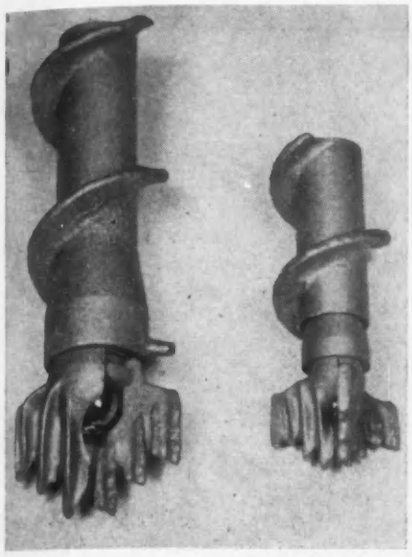
(This item supplements Yale Machine Works data on Pages 5251-5254 of the Composite Catalog, 20th Edition.)

For more data circle **No. E5** on Readers' Service Card, last page this issue.

Auger Bit

A new replaceable blade auger bit has been developed by Herb J. Hawthorne, Inc. for drilling softer formations. The recommended auger assembly consists of a combination locking bowl and adapter sub threaded with a female tool joint type of connection to fit standard augers. The sub is fitted with auger flights properly located to coincide with flights of the auger stem itself when connected.

Bit shanks are provided to accommodate an arrangement of either two or three rock cutter blades. The two-blade assembly is more readily used in all auger type formations as it permits passage of cuttings up the auger flight. Use of three



blades is suggested where hard stringers are encountered.

A steel ball is provided which seats inside the replaceable blades, against the lower end of the bit shank. This permits use of either fluid or air to assist in lubrication and removal of cuttings, but prevents plugging of the circulation port by the cuttings.

The new Hawthorne auger bit is available in Type "E", "DB" and "AC" adapter sizes, with blade sizes from 3½ to 6½ inches.

(This item supplements Herb J. Hawthorne, Inc. data on Page 2075 of the Composite Catalog, 20th Edition.)

For more data circle **No. E6** on Readers' Service Card, last page this issue.

Deep Drill Hole Logger

The new deep drill hole scintilogger announced by The Radiac Company, Inc., was designed for radioactivity logging of drill holes to 6000 feet. Its verified in-hole-out-hole radiation profiles identify oil productive zones in new wells as well as new productive zones in old wells.

The scintilogger is a portable, self-contained well logging system which includes a scintillation well logging probe, a minimum 2000 feet of cable, surface control box and graphic strip chart recorder synchronized to a footage counter (mounted on a stand containing the playout and take-up reel). The stainless steel probe, which is 36 inches long and 2 inches in diameter, may be weighted to assure complete descent through water and mud in uncased holes. It is mounted on a steel cable having a breaking strength of 1500 pounds and a rated strength of 900 pounds.

Time constants and sensitivity ranges are controlled at the surface to provide the operator with as much detail in his log as desired. Sections of interest can be re-logged at expanded scale or at other sensitivities while in the well. The log can be correlated with electric logs and cores while in operation and graphically illustrates changes in lithology as they occur, with the same sharp breaks or gradations.

For more data circle **No. E7** on Readers' Service Card, last page this issue.

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NO-GALL or LO-TORK Compounds give threads on tool joints and drill collars the best protection money can buy. They do this by minimizing friction—maximizing gall resistance. They spread easily, uniformly—never gum up or squeeze out. They lubricate without freezing—permit fast break-out on string after string of drill pipe.

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PRODUCTION

Christmas Tree

After several years of research and development work, Oil Center Tool Company has announced production of the first 30,000 pound test christmas tree.

New and different types of seals and connections were required and the valve had to be redesigned to make the higher pressure tree practical.

After checks, tests and studies, the Laurent float-ring seal was selected. It is employed throughout the new design, in addition to conventional API ring seal gaskets.

In making up a ring joint flange fitting, practice is to tighten the bolts, to a point, so that concentrated load on the seat ring will be sufficient to maintain a residual load over and above that required to make a fluid-tight seal. When internal pressure is increased, however, the residual load often is lowered to the point of causing leakage; also, due to variation in machining and variation of rings, it is practically impossible to obtain a metal-to-metal contact on all faces of a loose ring flange type joint until the ring has been deformed by stretching or compressing.

Float-ring joints used in the christmas tree permit a complete metal-to-metal contact without any undue pressure, regardless of variations in diameter of the ring or its set. Also, this wedge-shaped ring is easily removed without damage to seats or ring. W-K-M's new high pressure valves, used on the O-C-T christmas tree, are designed with a balanced stem to overcome heavy stem loads inherent in single stem valves, this load the result of internal body pressure acting on the end area of the stem tends to force it out of the valve bonnet. Threads, bearings and bonnet on a single stem valve must not only be designed to withstand this high load, but a great deal of effort is required to operate a single stem valve with this load on the threads and bearings.

Addition of the second stem permits this heavy force to be balanced out inherently. This "balancing stem" is attached to the bottom of the gate and the pressure in the valve body causes it to exert a force equal to and in the opposite direction to the force exerted on the operating stem. This valve requires much less effort to operate as force on the handwheel must overcome only the gate drag during operation.

Additional features include the fully-protected rising stem which permits stem threads to be outside the body, and the balancing stem becomes an open-close indicator.

The choke employed in the design of the new 30,000 pound test O-C-T christmas tree incorporates standard and proved O-C-T choke beans. They can be furnished with various wear-resistant alloys. This special heavy design choke is provided now only with a positive choke. The choke body, however, is designed so that an adjustable choke is interchangeable.

All components of the new O-C-T christmas tree are machined from carefully selected, special analysis steel. Each component has been tested individually to pressures far in excess of the 30,000 pound rating of the complete assembly.

In the photographs, H. O. Quebe, left, director of engineering for Oil Center Tool Company, and Allen Cochrum, engineer, show the first 30,000 pound test christmas tree after it had been subjected to a six-weeks series of tests far in excess of the 30,000 pound rating.

(This item supplements Oil Center Tool Company data on Pages 3689-3720 of the Cosposite Catalog, 20th Edition.)

For more data circle **No. E8** on Readers' Service Card, last page this issue.

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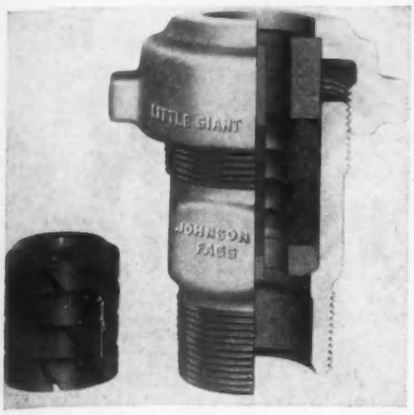
NEW EQUIPMENT . . .



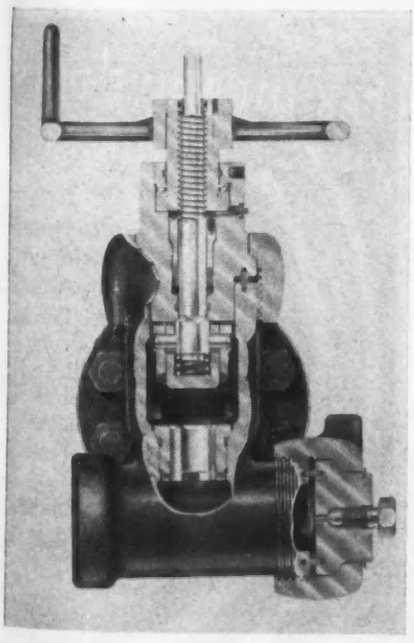
Stuffing Box

Two new Johnson-Fagg Little Giant stuffing boxes are now available for use on shallow to medium depth wells.

The J-F Economy Stuffing Box, made of high strength malleable iron, is recommended for working pressures up to 1500 psi. It is available with 2-inch, 2½-inch or 3-inch bottom male thread. For combined pumping tee and stuffing box application, the new J-F Economy Tee Type Stuffing Box is available with 2-inch upset or regular bottom female thread. Both types are priced complete with four 2¼-inch O.D. J-F cone seal packing rings and non-scoring guide bearings.

(This item supplements Johnson-Fagg Engineering Company data on Pages 2514-2515 of the Composite Catalog, 20th Edition.)

For more data circle No. E9 on Readers' Service Card, last page this issue.



Valve and Choke Assemblies

The Texas Tool & Machine Company has developed two flow valve and choke assemblies, the Dual-Matic, which combine reliability of true heavy duty valves with compactness and economy of unit valve and choke assemblies.

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NEW EQUIPMENT . . .

seal is the heart of the TTM flow valve. In tests, the resilient sealing element gives a drop-tight seal even when the floating plug is purposely damaged.

The entire plug, seat and stem assembly can be replaced without taking the valve off the christmas tree or preventer hook-up. In event of stem packing leak, the chevron packing may be replaced under pressure with the valve in full open position.

TTM Dual-Matic flow valve and choke assemblies are made in two types: the conventional type which replaces the christmas tree tee as well as the wing valve and choke, and the new straight type which can be attached to the christmas tree cross or tee. This straight type is adapted for use as a blowout preventer valve and choke.

(This item supplements Texas Tool & Machine Company data on Pages 4810-4811 of the Composite Catalog, 20th Edition.)

For more data circle **No. E10** on Readers' Service Card, last page this issue.

Tubing Anchor

A new tension-type tubing anchor has been designed by Texas Iron Works to hold tubing of a pumping well in tension to prevent reciprocation of the pump. This reduces lost motion in the pumping stroke and eliminates tubing collar and casing wear.

The anchor is strictly mechanical in function, with positive setting regardless of fluid levels or pressure differentials. It may be located in the tubing string either above or below the working barrel of the pump.

The anchor is prepared for running in with automatic latch at top made up and slips retracted. It is available in three sizes.

(This item supplements Texas Iron Works data on Pages 4813-4848 of the Composite Catalog, 20th Edition.)

For more data circle **No. E11** on Readers' Service Card, last page this issue.

Well Formation Heater

An electric oil well formation heater has been developed by the Westinghouse Electric Corporation to revive or improve oil production from plugged-up wells. Lowered into a well to depths of previous production, the tubular heaters raise the temperature of the oil, melting the wax-like plugging material in the oil-bearing sand.

Heater assembly is threaded into a standard length of 2-inch pipe and lowered into the well. Succeeding sections of pipe are added at the surface until the heater reaches desired depth. A single conductor cable to power the heater is clamped at intervals to the outside of the 2-inch pipe as heater and pipe are fed into the hole.

The heater consists of four steel-sheathed elements supported at the top by a steel terminal box and at the bottom by a protective steel nose. Each of the heaters is grounded to the bottom steel nose, and power is returned to the surface through the pipe.

For more data circle **No. E12** on Readers' Service Card, last page this issue.

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New Equipment Catalogs and Literature

For more data on New Equipment or copies of Catalogs and Literature reviewed in this issue, use the Readers' Service postcards just inside the back cover and facing the Advertisers Index. Simply circle code numbers of items desired—sign and mail card. Requests are transmitted to the manufacturer as soon as received by us for mailing of desired information directly to you.

Fishing Tool Bulletin

The new Milwaukee magnetic fishing tool is featured in a bulletin which announces Ideco, one of the Dresser Industries, as exclusive world-wide export distributor. Outstanding features of the tool, stressed in the booklet, include magnetic basket to catch and hold small junk; circulation returned through the center of the tool where magnetic intensity is greatest; and high cobalt content. Outside diameters of the five available models illustrated range from 4½ inches to 10 inches, with API regular or pin-up tool joints. Tools are furnished with interchangeable washover, fishtail and milling shoes.

To get a copy circle **No. E13** on Readers' Service Card, last page this issue.

Illuminators Data Sheet

A new data sheet recently issued by Jerguson Gage & Valve Company illustrates and describes the newly-improved Jerguson solid-wedge type illuminators. Important changes, including the way the plastic wedge is mounted to give greatly improved, even diffusion of light over the gage glass, are described.

Also described and pictured is the UL approved explosion-proof lighting unit. Specifications and models available are included.

To get a copy circle **No. E14** on Readers' Service Card, last page this issue.

Power Unit Brochure

International Harvester Company's Industrial Power division has recently released a booklet describing the UD-1091 power unit, the largest diesel model in International's heavy-duty power line. The six-cylinder, valve-in-head engine develops 190 horsepower at 1400 rpm.

The new booklet contains full specifications, photographs and performance charts on the unit, as well as descriptions of available attachments.

To get a copy circle **No. E15** on Readers' Service Card, last page this issue.

Rubber Goods Catalog

A molded rubber goods and industrial sheet-packing catalog has been issued by Hewitt-Robins, Inc.

The molded rubber goods section contains a specification chart comparing qualities of six types of natural and synthetic rubber used by the company in the manufacture of molded products for original equipment manufacturers. Also included in this section is a check-sheet type form for readers desiring engineering assistance on special problems.

The industrial sheet packing section lists ten types of all-purpose pure gum and synthetic rubber sheet packing and the recommended uses for each. Included in this section is a chart showing hardness, tensile strength, elongation, approximate weight, and standard width of each item.

To get a copy circle **No. E16** on Readers' Service Card, last page this issue.

Completion Services Folder

Lane-Wells Company's complete Thru-Tubing service for permanent-type well completions, plus features of this type completion, are described in a new bulletin recently published by the company. Available to operators in nearly all major oil-producing areas, the Lane-Wells service provides thru-tubing perforating, thru-tubing collar location and, when required, thru-tubing radioactivity well logging.

To get a copy circle **No. E17** on Readers' Service Card, last page this issue.

Wire Rope Catalog

In a new catalog, the Wire Rope Corporation of America, Inc. describes correct use of wire rope in rotary drilling and cable tool drilling. The catalog contains extensive data and tabular material of interest to all users of wire rope. Also included is a chapter on field troubles and their causes.

The company's Ton-Mile Calculator, a slide chart which figures ton miles for all standard drill pipe sizes, also has been published.

To get a copy circle **No. E18** on Readers' Service Card, last page this issue.

Pump Bulletins

Bulletins presenting up-to-date information on five Ideal power duplex pumps ranging from 80 to 600-horsepower have been released by The National Supply Company.

The Ideal D-50, C-100, C-150-B, C-250 and C-350 slush pumps, representing a complete line of pumps for mud circulation for all types of drilling, offer rugged construction, pre-loaded main bearings and consistent rating standards for performance in their given operating ranges.

Bulletins give design features, performance charts, and specifications.

To get a copy circle **No. E19** on Readers' Service Card, last page this issue.

Casting Process Literature

Lebanon Steel Foundry announces publication of a sales bulletin on Ceramicast, a new casting process which utilizes ceramic molds. Resulting castings have smooth surfaces, with surface variations held to a maximum of 125 micro-inches; intricate shapes, of complex casting design and detail; thin metal sections, where thicknesses of 1/16-inch and less are desired; close tolerances, from .003 to .005 inches per inch; reduced machining costs and lower production costs. The castings are also adaptable to almost any casting size or alloy.

To get a copy circle **No. E20** on Readers' Service Card, last page this issue.

Engine-Gear Set

Publication of a new bulletin, "Nordberg Supairthermal Engine-Gear Set" for driving centrifugal compressors and high speed pumps has been announced by Nordberg Manufacturing Company. It describes advantages of the Nordberg supairthermal V-type engine-gear set for operation on large capacity gas pipe lines.

In addition, the bulletin points up compactness and efficiency of the set and explains why it can be installed with lower capital investment and operated at lower cost per horsepower hour than other gas pipe line prime movers.

Illustrations show the engine-gear set driving a centrifugal compressor and details of the Nordberg-built speed increasing gear.

To get a copy circle **No. E21** on Readers' Service Card, last page this issue.

Rig Power Booklet

"Caterpillar Drill Rig Power," a brochure recently released by Caterpillar Tractor Company, features contributions of Cat diesel power to the increase in oil well drilling efficiency in recent years. With engine operating costs determining in a large part whether or not drilling operations are profitable, Cat engines, delivering advertised, conservatively rated horsepower, are shown to hold costs to a minimum.

A list of 12 Cat oil field engines and electric sets available is included in the new booklet.

To get a copy circle **No. E22** on Readers' Service Card, last page this issue.

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